

# KEYSTROKES

calculator activities  
for young students



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PLORING NEW TOPICS



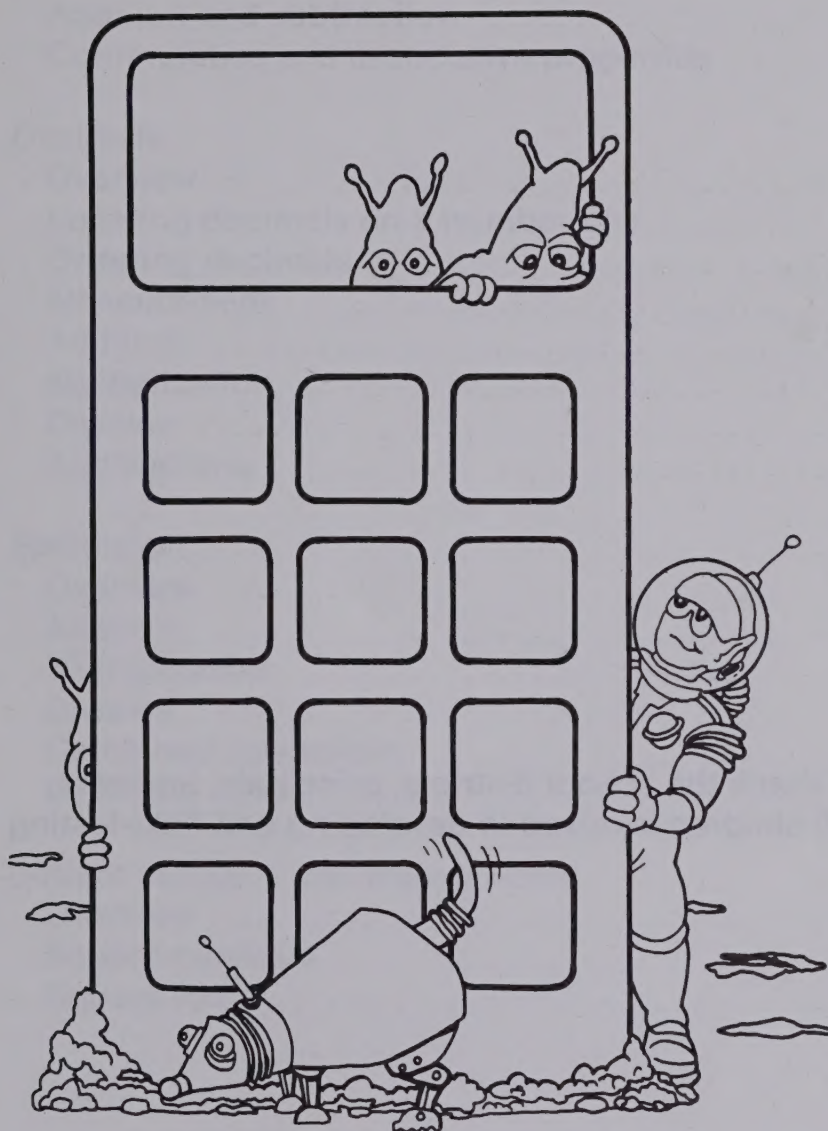
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# KEYSTROKES

calculator activities for young students

## EXPLORING NEW TOPICS



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3 4 5 6 7 8 9 10 . 8 9 8 7 6 5 4 3

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# INTRODUCTION

The Keystrokes series provides a wide range of classroom-tested calculator activities for students in grades 2 through 8. The books in the series are:

*Keystrokes—Counting and Place Value* (grades 2–3)

*Keystrokes—Addition and Subtraction* (grades 3–6)

*Keystrokes—Multiplication and Division* (grades 4–6)

*Keystrokes—Exploring New Topics* (grades 5–8)

*Keystrokes—Exploring New Topics* is appropriate for grades 5 through 8 and includes activities on integers, decimals, estimation, problem solving, geometry, square numbers, and square roots. All of the activities have been developed for and used with a variety of textbook series and can be easily integrated into any current mathematics program.

## How To Use This Book

*Keystrokes—Exploring New Topics* is divided into four sections, each one focusing on a different skill or group of skills. Activities that require similar abilities and similar uses of the calculator have been grouped together.

Each section is preceded by an overview, which explains the importance of the activities.

At the top of each page, you will see a listing of skills, ordered by emphasis, with the first skill giving the main focus of that activity. Some of the pages include, as well, teaching suggestions for implementing the activities. These pages can be identified by the special “teacher creature,” which will alert you that some extra preparation may be involved.

Teacher creature



These Keystrokes activities should be used with a four-function calculator with eight-digit display. The calculators that you and your class are using should also have a constant addend feature that enables you to “count,” or display consecutive numbers, in the following manner:

Press  $\oplus 1 = = =$  . . . .

Your calculator should display 1, 2, 3, 4, . . . .

It is important that you check your calculator for this particular function, for the activities that require this capability include pages 2, 7, 8, 9, 23, and 26. If your calculator does not have this capability, you should check these activities carefully before using them.





## Getting Started

If your students have never used calculators before, they may need several minutes to become familiar with them. Students are typically very excited about using calculators for the first time. Experience has shown that letting them experiment with the calculator for a few minutes helps reduce this excitement to a manageable level. At the end of this time, most students will be eager for guidance.

After students have had a chance to explore on their own, you may wish to provide a brief description of the keys and how they are used. In particular, students should understand that  $\text{C}$  must be pressed after each exercise.



## Helpful Hints

A one to one correspondence between students and calculators is ideal. Many calculator activities, however, can be effectively used by two students sharing one calculator.

Boxes that are similar to those in which vinegar and cooking oil are shipped provide excellent storage for calculators. These boxes can often be obtained from grocery stores or supermarkets.

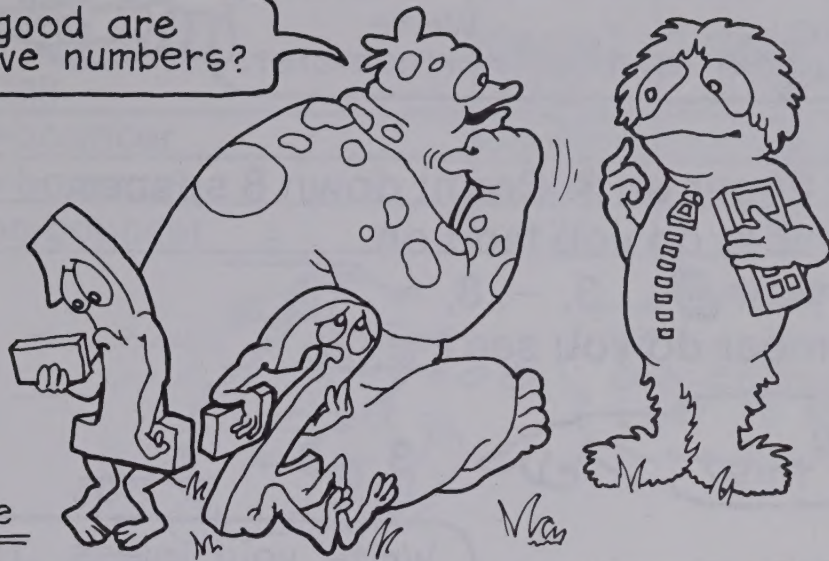
Remind students to turn off the calculators that are not being used. Assign to one of your students the responsibility of checking the storage box after each lesson to see that all of the calculators are turned off.

If the calculators are to remain in your classroom all year, you will find it helpful to have the students tape their names on the calculators. This will promote a sense of responsibility.



# Integers

What good are negative numbers?

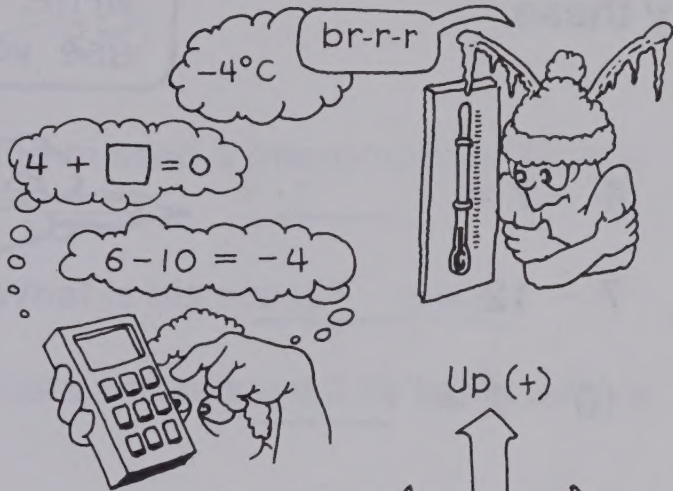
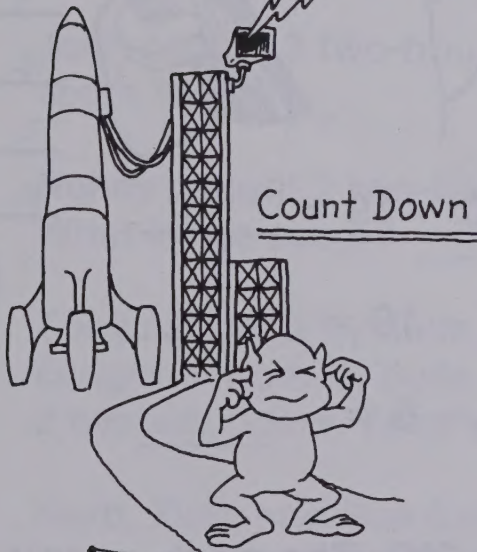


## Keeping Score

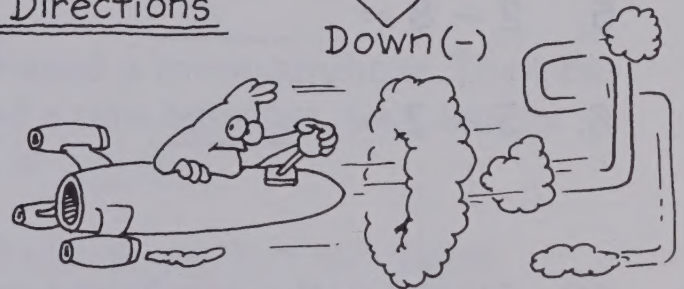
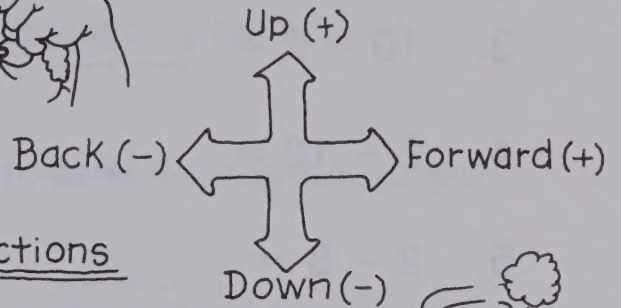
Arnold	-4
Jack	-2
Nancy	-1
Dorothy	+1



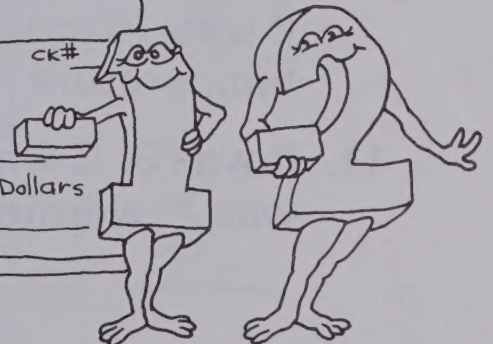
T minus four and counting



## Directions



check amount	Balance	J. Freval 5678 MAIN STREET DIZNEYLAND, CA.	ck#
\$150	92.37	Pay to the order of: _____ \$	
	-57.63	_____ Dollars	
		First Rational Bank 17: +6*1113 ✓	





Enter 10, -, 1, =, =, ... Write each number on the thermometer.



Students may need help getting started.

Put your finger on 3. Count down 8 spaces.

What number do you land on -5

Enter in your 3, -, 8, =

What number do you see? -5

Can you answer this?

$3 - 8 = \underline{-5}$

Try these.

Write your guess. Then use your to check.

1.  $4 - 7 = \underline{-3}$

2.  $7 - 12 = \underline{-5}$

3.  $10 - 2 = \underline{8}$

4.  $2 - 10 = \underline{-8}$

5.  $2 - 8 = \underline{-6}$

6.  $5 - 2 = \underline{3}$



7.  $10 - 19 = \underline{-9}$

8.  $9 - 10 = \underline{-1}$

9.  $6 - 6 = \underline{0}$

10

9

8

7

6

5

4

3

2

1

0

-1

-2

-3

-4

-5

-6

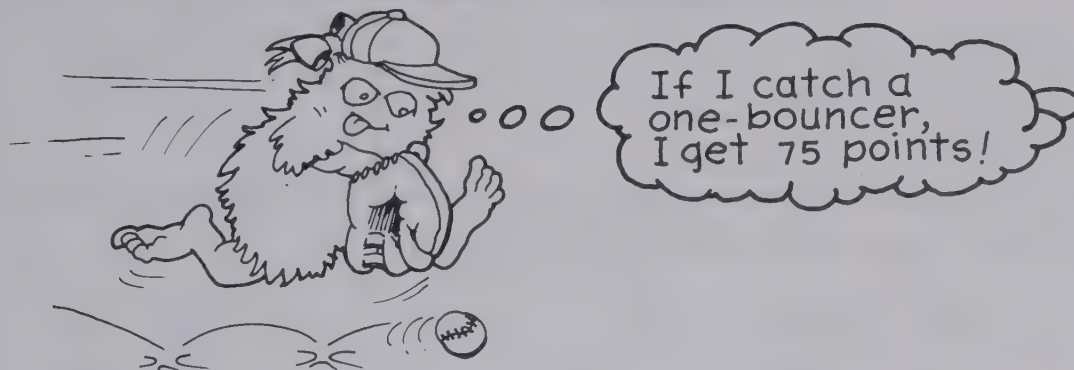
10. At noon, the temperature was  $5^{\circ}\text{C}$ . The next morning, it was  $15^{\circ}$  colder. What was the morning temperature?  $-10$

11. It was  $3^{\circ}\text{C}$  when Chris went to school. By noon, it was  $7^{\circ}$  warmer. What was the temperature at noon?

$10^{\circ}\text{C}$



SCORING		
	Catch	Miss
Fly ball	+100	-100
One-bouncer	+75	-75
Two-bouncer	+50	-50
Three-bouncer	+25	-25



- Mary caught 2 fly balls and missed a one-bouncer. Mary's score is 100.
- John missed 2 fly balls. What is his score? -200
- Josh caught 3 two-bouncers and missed 3 fly balls. Josh's score is 0.
- Nancy caught 2 two-bouncers and missed 4 three-bouncers. What is her score? -50
- Tony caught 2 fly balls, and missed a three-bouncer. Then he caught 3 more fly balls, missed a one-bouncer, and caught 2 two-bouncers. Tony's score is 100
- Herb, Tina, and Sue had these scores early in the game:

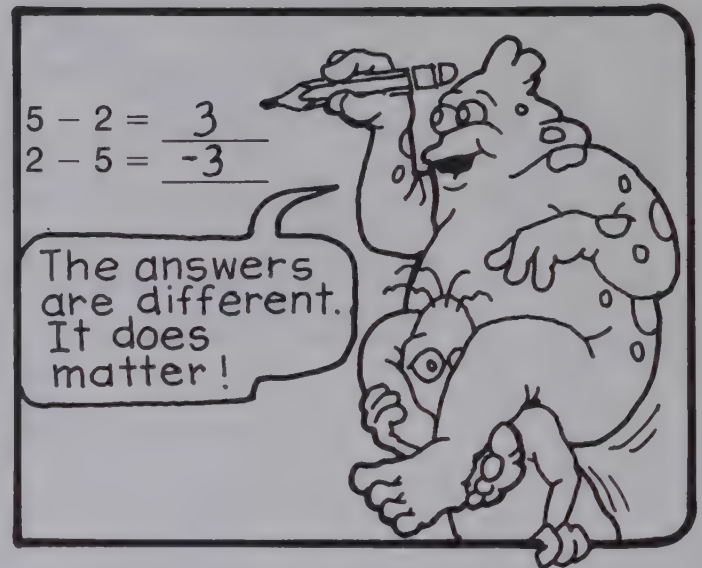
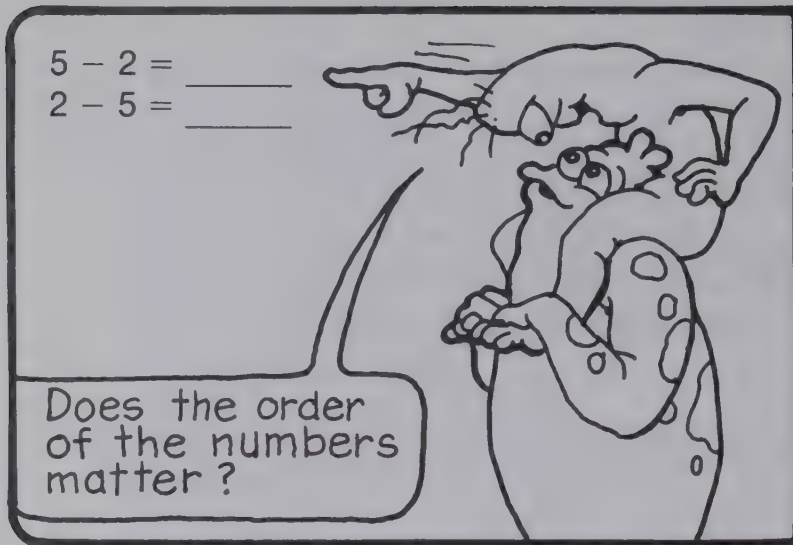
Scores	
Herb	-250
Tina	-400
Sue	-100



Who was ahead? Sue

How many points did Tina need to win? 900





Try the commutative property.

1.  $49 + 78 = 127$

$78 + 49 = 127$

Are the answers the same? yes

2.  $49 - 78 = -29$

$78 - 49 = 29$

Are the answers the same? no

3.  $7 - (5 - 3) = 5$

$(7 - 5) - 3 = -1$

Are the answers the same? no

Does order matter?



4.  $7 + (5 + 3) = 15$

$(7 + 5) + 3 = 15$

Are the answers the same? yes

5.  $76 + (43 + 15) = 134$

$(76 + 43) + 15 = 134$

Are the answers the same? yes

6.  $76 - (43 - 15) = 48$

$(76 - 43) - 15 = 18$

Are the answers the same? no

Try these.

7.  $84 - 37 = 47$

8.  $37 - 84 = -47$

9. What do you notice about the answers to problems 7 and 8? \_\_\_\_\_

10. Can the answer to problem 7 help you in answering problem 8? \_\_\_\_\_



# Decimals

Why do we have to learn decimals?

yeah, what's the point?

Which is greater?

DECIMALS

DECIMALS

Inverse

$$4 \times \square = 1$$

$$\frac{3}{4} \quad \frac{7}{8}$$

$$3 \div 4 = 0.75$$

$$7 \div 8 = 0.875$$

96,522.9

$\frac{7}{8}$  is greater.

What will it read if you drive one tenth of a mile?

965229

This measures 10.5 centimeters... yuk!

150¢ = \$1.50

30 quarts  
4 quarts per gallon  
How many gallons?

$$30 \div 4 = 7.5$$

- Decimals
- Integers
- Fractions
- Natural Numbers

Number System Building



# How Much Is Half?

Name \_\_\_\_\_

Cut out this  
strip of paper.



1. How long is the strip of paper? 10 cm
2. Fold the strip in half. How long is the strip now? 5 cm

Use your  to find  $22 \div 2$ . 11

Did you get half of 22? yes

3. Fold the strip in half again. What is its length? 2.5 cm  
 $11 \div 2 =$  5.5


4. Fold the strip in half one more time.

How long is this strip? 1.25 cm

$$5.5 \div 2 =$$
 2.75

5. Compare your answers in problems 7 and 8.

Try some more.

Use your .

6. Tom has 13 cm of licorice. He gives half to Linda.

How long is Linda's half? 6.5 cm



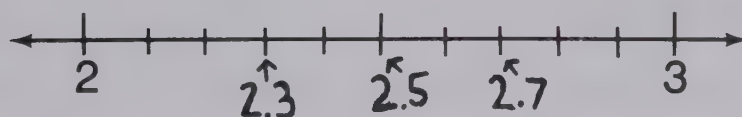
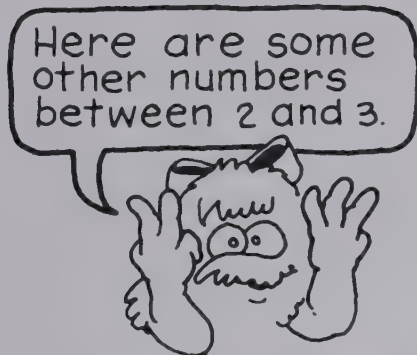
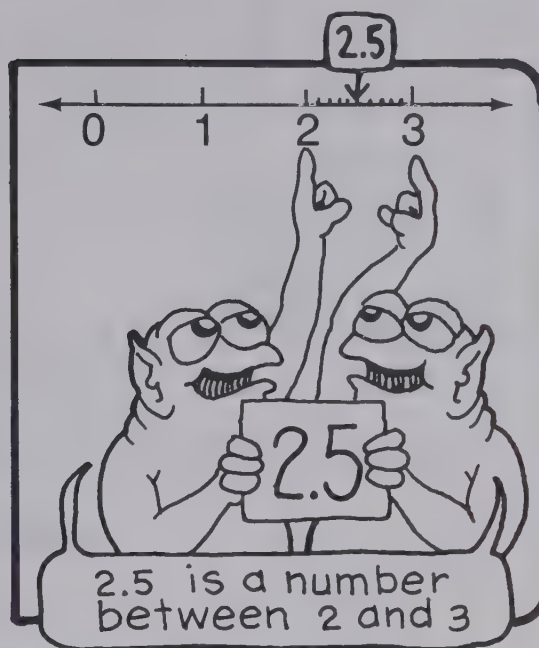
7. Linda gives half of her licorice to Gail. How long  
is Gail's licorice? 3.25 cm

8. If Gail were to give away half of her licorice,  
how much would she have left? 1.625 cm

9. Would it be easy to measure all of these pieces of licorice  
with a ruler? no

Why not? because it is too small





Find these numbers on the number line → 2.1 2.8 2.6

Start at 1 and count by tenths.

Enter 1, +, .1, =, =, ....



Write the numbers here.

Start at 3.2 and count by tenths. Enter 3.2, +, .1, =, =, ....

Write the numbers here.

Find these numbers on this number line.




What decimal is halfway between 3 and 4 on the number line? \_\_\_\_\_

Start at 2.7 and count by tenths. Write the numbers below.

\_\_\_\_\_



Use your  to count by tenths.

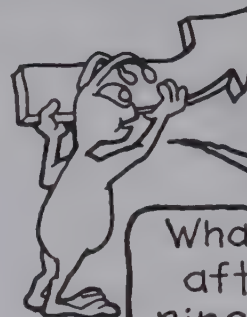
0.1 0.2 0.3 0.4 0.5 \_\_\_\_\_




Enter +, .1, =, =, ....



That's two tenths.



What comes after nine tenths?

Count by tenths. Write each number that your  shows.

1.  $1 + .1 =$  \_\_\_\_\_  
 $\underline{1.1}$  \_\_\_\_\_

What number comes after 1.9? 2.0

2.  $4 + .1 =$  \_\_\_\_\_  
 $\underline{4.1}$  \_\_\_\_\_

3.  $5.6 + .1 =$  \_\_\_\_\_  
 $\underline{5.7}$  \_\_\_\_\_

What comes after 6.6? \_\_\_\_\_

Now count by hundredths. Enter +, .01, =, =, ....

4.  $+.01 =$  \_\_\_\_\_  
 $\underline{0.01}$  \_\_\_\_\_

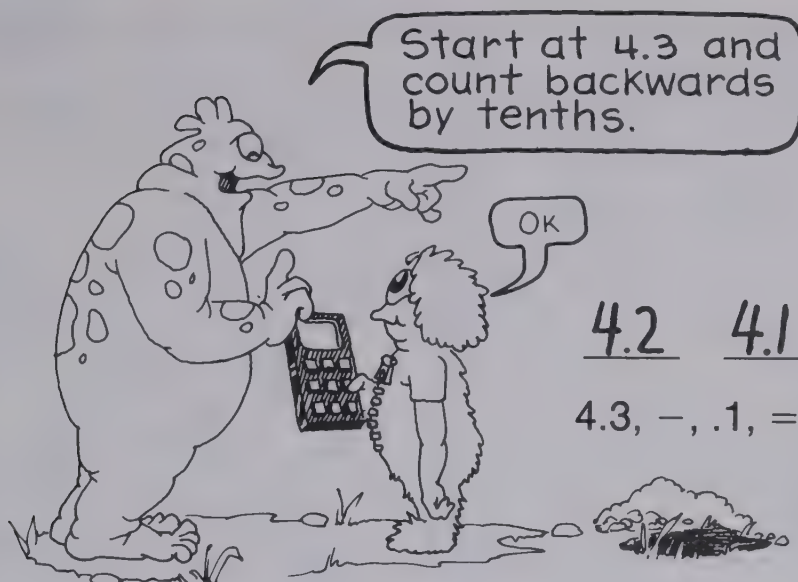
5.  $9 + .01 =$  \_\_\_\_\_  
 $\underline{9.01}$  \_\_\_\_\_

What comes after 9.09? 9.10 or 9.1

6.  $9.96 + .01 =$  \_\_\_\_\_  
 $\underline{9.97}$  \_\_\_\_\_

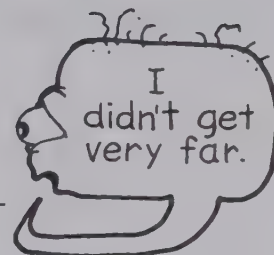
What comes after 10.09? 10.10 or 10.1





Try these.

1.  $8.2 - .1 =$        $=$        $=$        $=$        $=$   
8.1      \_\_\_\_\_



2.  $5.4 - .1 =$        $=$        $=$        $=$        $=$        $=$   
 \_\_\_\_\_

3.  $84.6 - .1 =$        $=$        $=$        $=$        $=$        $=$   
 \_\_\_\_\_

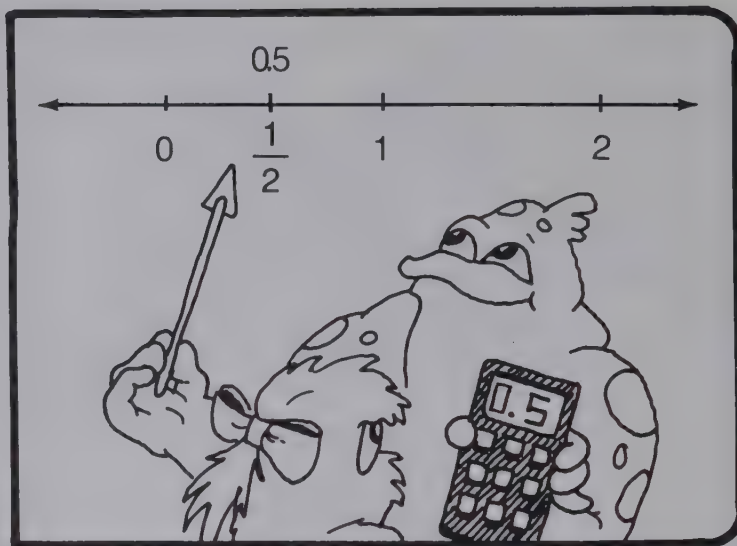
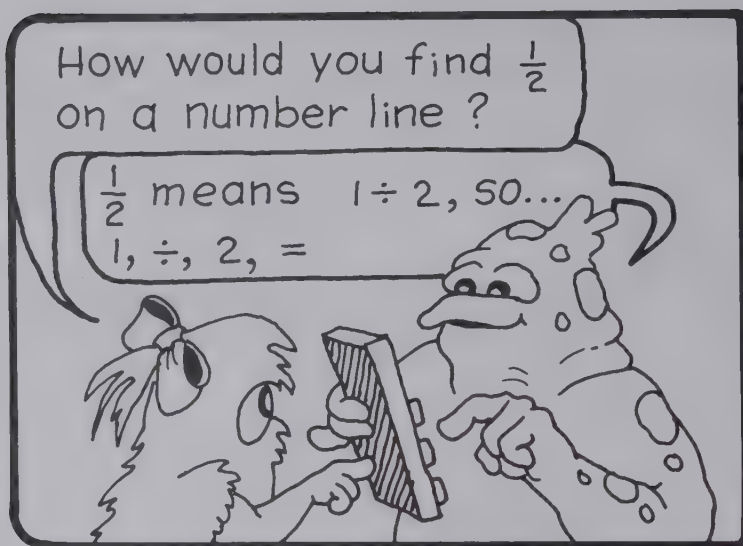
4.  $10 - .1 =$        $=$        $=$        $=$        $=$        $=$   
 \_\_\_\_\_

Now count backwards by hundredths.

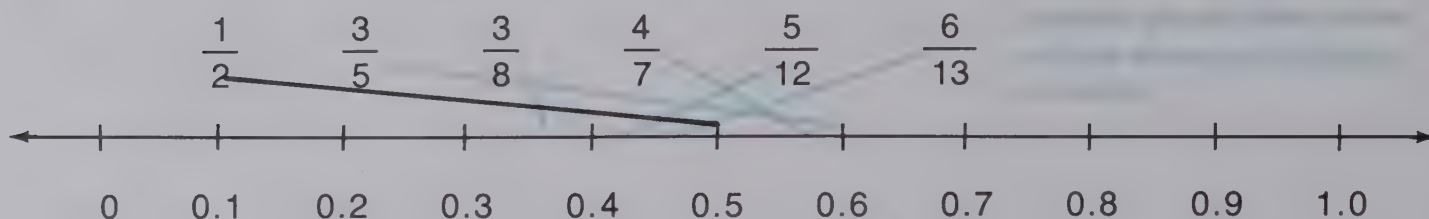
5.  $8.2 - .01 =$        $=$        $=$        $=$        $=$        $=$   
8.19      \_\_\_\_\_

6.  $19.81 - .01 =$        $=$        $=$        $=$        $=$        $=$   
 \_\_\_\_\_

7.  $10 - .01 =$        $=$        $=$        $=$        $=$        $=$   
 \_\_\_\_\_



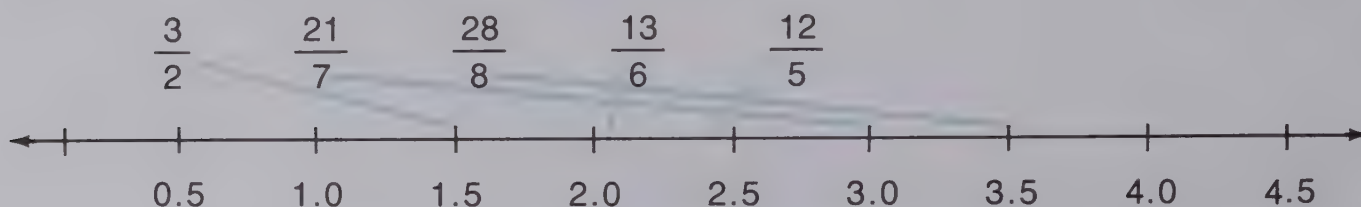
1. Find each fraction on the number line. Use your .



2. Which fraction is greatest? \_\_\_\_\_

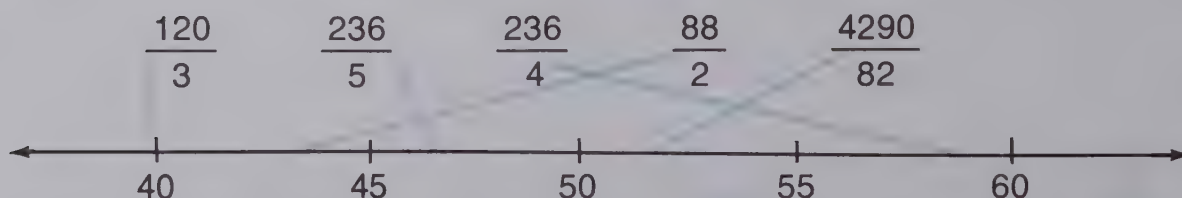
3. Which fraction is least? \_\_\_\_\_

4. Locate these fractions on the number line.



5. Which fraction is greatest? \_\_\_\_\_ Least? \_\_\_\_\_

6. Locate these fractions on the number line.



7. Which fraction is greatest? \_\_\_\_\_ Least? \_\_\_\_\_





Change each fraction to its decimal equivalent. Use your .  
Round the decimal to the nearest hundredth.



Write the decimal here.

- |                            |                            |                              |                                 |
|----------------------------|----------------------------|------------------------------|---------------------------------|
| E. $\frac{7}{9}$ _____     | N. $\frac{7}{5}$ _____     | M. $\frac{9}{4}$ _____       | E. $\frac{3}{10}$ _____         |
| M. $\frac{13}{21}$ _____   | I. $\frac{25}{26}$ _____   | T. $\frac{4}{33}$ _____      | D. $\frac{45}{44}$ _____        |
| A. $\frac{80}{53}$ _____   | D. $\frac{60}{54}$ _____   | S. $\frac{85}{211}$ _____    | A. $\frac{96}{185}$ _____       |
| L. $\frac{786}{644}$ _____ | M. $\frac{792}{988}$ _____ | E. $\frac{9007}{6716}$ _____ | H. $\frac{3,760}{14,461}$ _____ |

What do Catherine the Great and Smoky the Bear have in common?  
To find out, write the decimals below in order from lowest to highest.  
Write the equivalent fraction and the letter of the problem above  
each decimal.

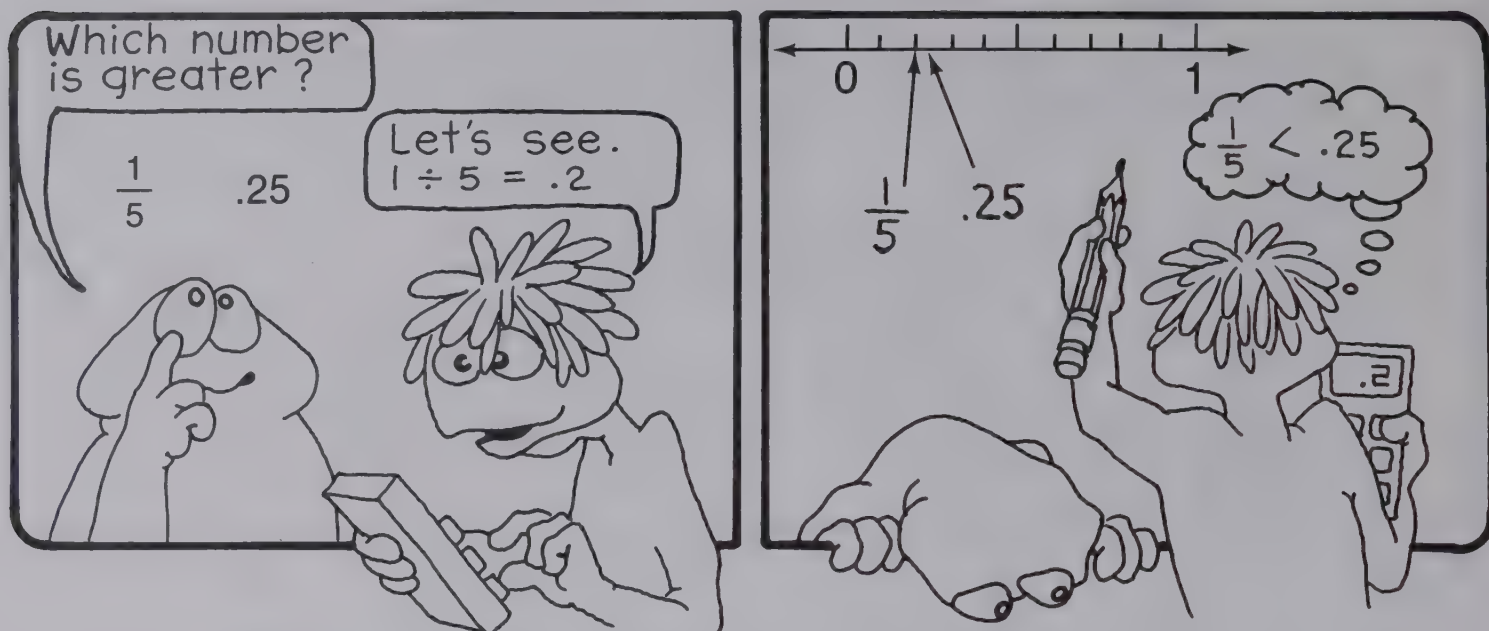
T \_\_\_\_\_

$\frac{4}{33}$  \_\_\_\_\_

.12 \_\_\_\_\_



Write the decimals here.



Compare the numbers. Use  $>$ ,  $<$ , or  $=$ .

A.  $\frac{1}{4}$  0.50

B. .45  $\frac{3}{8}$

C.  $\frac{3}{6}$  0.5

D.  $\frac{5}{12}$   $\frac{4}{9}$

E.  $\frac{6}{4}$  1.25

F.  $\frac{2}{8}$   $\frac{4}{16}$

G.  $\frac{21}{14}$  1.5

H. 1.57  $\frac{12}{8}$

I.  $\frac{45}{10}$   $\frac{19}{14}$

J. 2.43  $\frac{22}{8}$

K.  $\frac{6}{7}$   $\frac{5}{6}$

L.  $\frac{43}{50}$  0.86

M.  $\frac{3}{4}$   $\frac{4}{3}$

N.  $\frac{7}{8}$  0.85

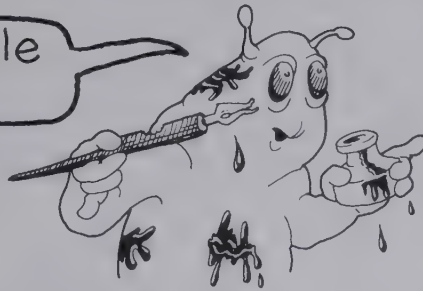
O. 1.10  $\frac{11}{10}$

P. 2.36  $\frac{24}{10}$



M-2 measured a quarter, a nickel, and a penny very carefully.

This is the table that I made.



Coin	Diameter
Quarter	2.4 cm
Nickel	2.1 cm
Penny	1.9 cm



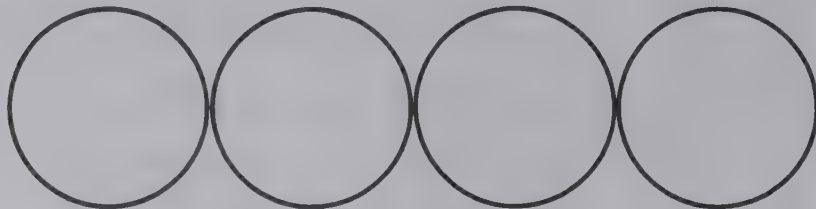
Measure the length of each group of coins. Compare your measurements with those in the table.

Remember to measure the diameter.



Coins	Measure	From the Table
<div>penny</div> <div>penny</div> <div>nickel</div>		Use your  . $1.9 + 1.9 + 2.1 = 5.9 \text{ cm}$
<div>nickel</div> <div>nickel</div> <div>penny</div>		
<div>quarter</div> <div>nickel</div> <div>penny</div>		
<div>nickel</div> <div>quarter</div> <div>nickel</div>		
<div>quarter</div> <div>quarter</div> <div>penny</div>		

1. The diameter of one quarter is 2.4 centimeters.  
What do four quarters measure? Use your ruler.



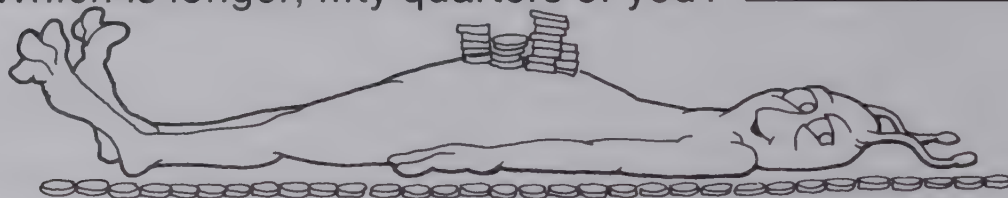
Four quarters  
measure \_\_\_\_\_.

2. Now use your .  
One quarter measures 2.4 centimeters, so  
four quarters measure \_\_\_\_\_.



Were you  
close?

3. What do fifty quarters measure? Use your . \_\_\_\_\_
4. What is your height in centimeters? \_\_\_\_\_
5. Which is longer, fifty quarters or you? \_\_\_\_\_



6. Jane's quarters measure 43 centimeters. How many quarters  
has she? \_\_\_\_\_
7. Pete's quarters measure 29 centimeters. How many quarters  
has he? \_\_\_\_\_
8. Rosa measured all of her quarters. Their length  
was 34 centimeters.  
How many quarters did Rosa measure? \_\_\_\_\_
9. Ron measured his quarters. Their length was 50 centimeters.  
How many quarters did Ron measure? \_\_\_\_\_

My shows decimals for  
the last four problems.

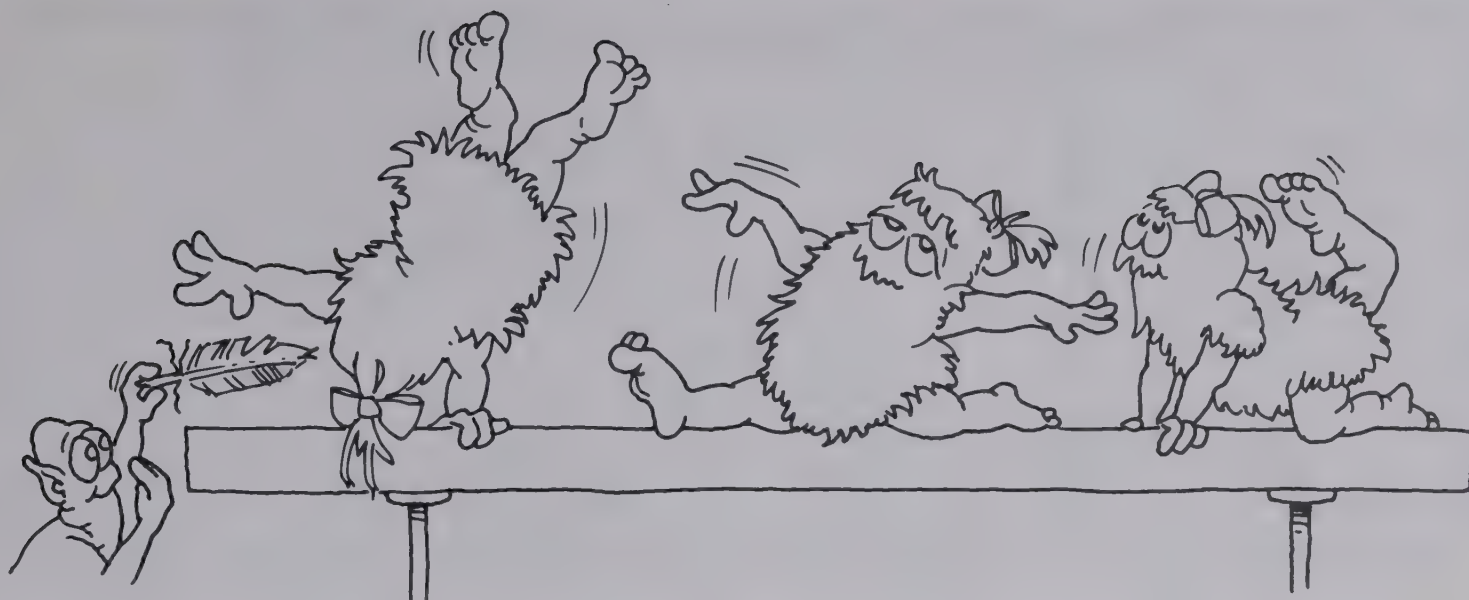


Can you explain why?



# On the Beam

Name \_\_\_\_\_



Each girl received four scores. To find the overall score for each, cross out the highest and the lowest scores and add the two remaining scores.

	Judge 1	Judge 2	Judge 3	Judge 4	Overall Score
Team One					
Maria	4.2	<del>4.8</del>	<del>4.0</del>	4.4	<u>8.6</u>
Judy	4.7	4.9	5.1	5.3	_____
Jan	5.1	6.6	6.0	5.5	_____
Barb	3.1	2.8	3.6	3.7	_____
Teri	7.4	7.5	7.5	8.0	_____
Team Two					
Elaine	3.7	4.7	4.0	3.8	_____
Debbie	4.2	4.8	4.1	4.6	_____
Ann	5.7	5.3	5.1	5.2	_____
Heather	7.6	6.0	6.1	6.2	_____
Kathy	8.0	7.6	8.1	8.2	_____

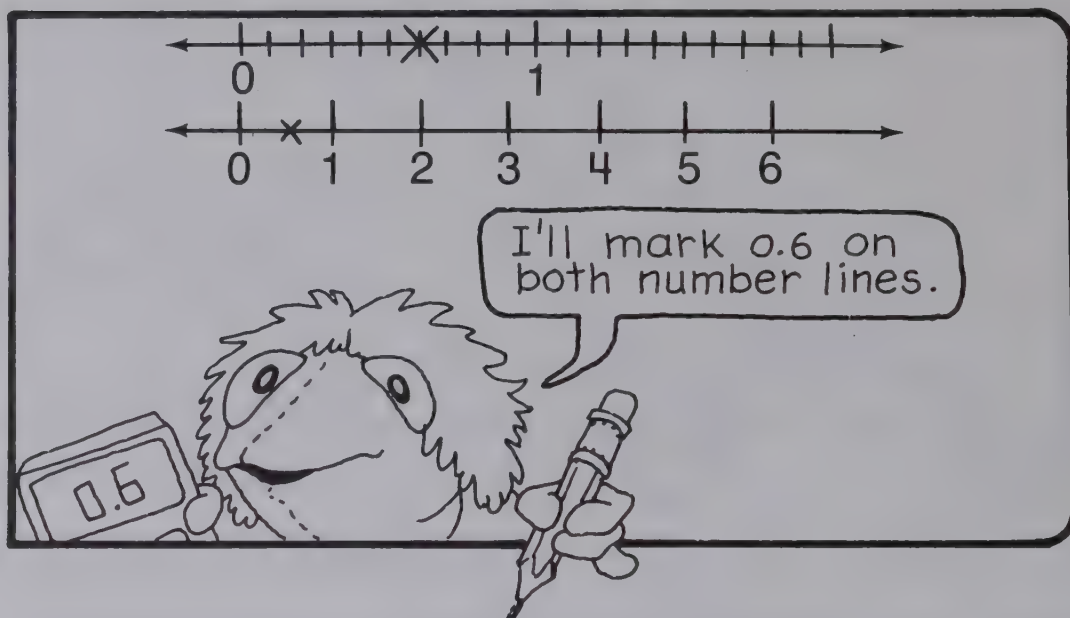
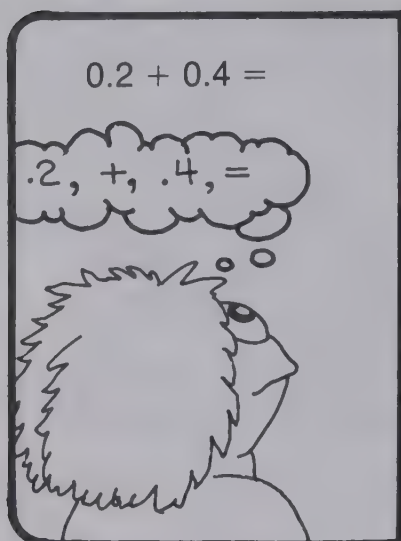
1. Find the total score for each team.

Team 1 \_\_\_\_\_ Team 2 \_\_\_\_\_

2. Who took first place? \_\_\_\_\_

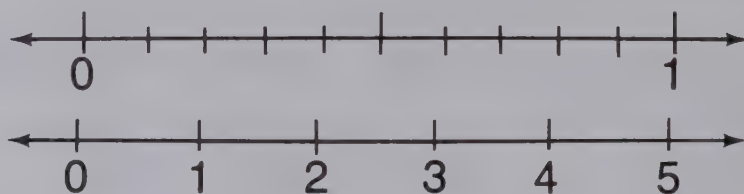
3. Who took second place? \_\_\_\_\_

4. Who came in third? \_\_\_\_\_

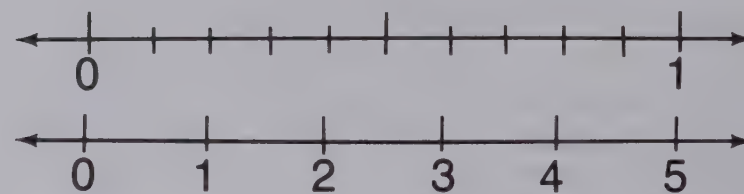


Use your to find each sum or difference. Then locate the answer on both number lines.

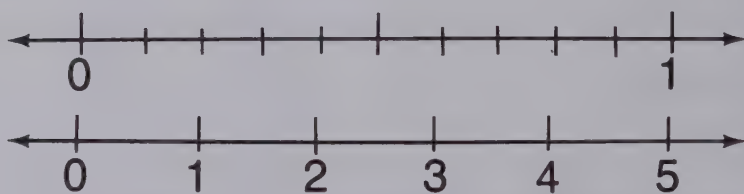
1.  $0.7 - 0.2 =$  0.5



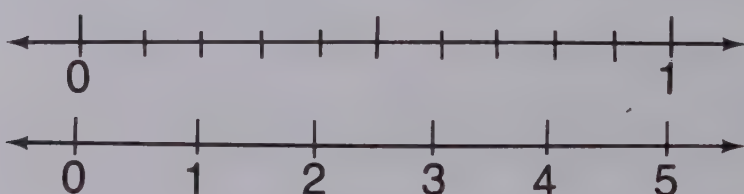
2.  $0.3 + 0.6 =$  0.9



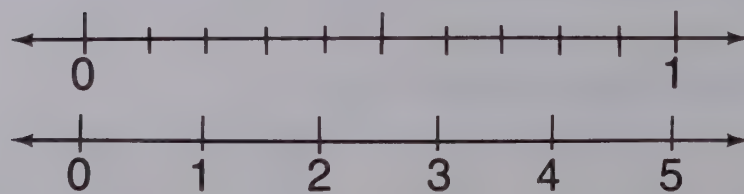
3.  $0.9 + 0.6 =$  1.5



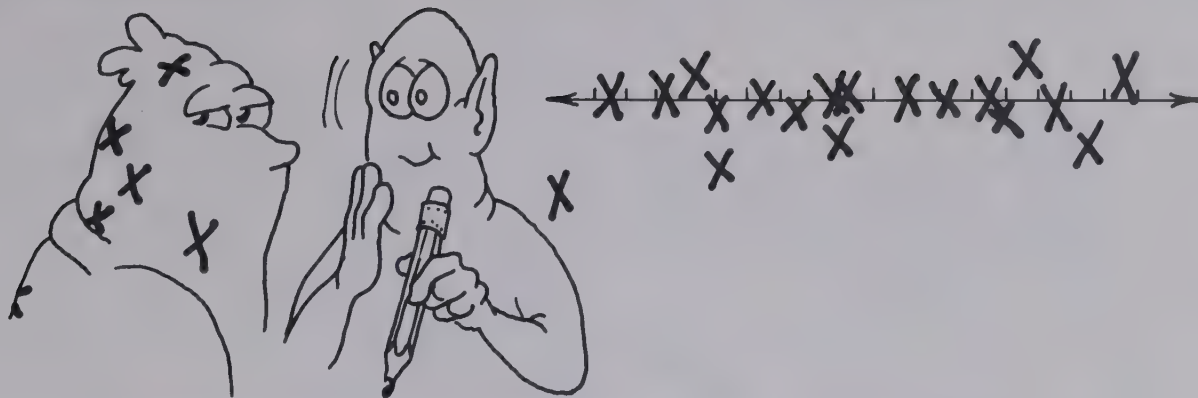
4.  $1.3 - 0.7 =$  0.6



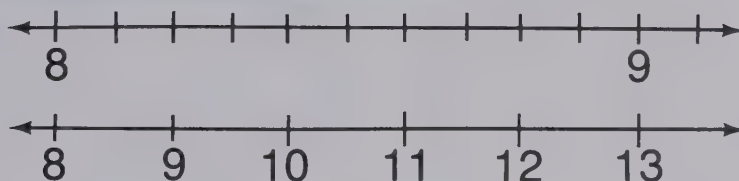
5.  $0.4 + 0.7 =$  1.1



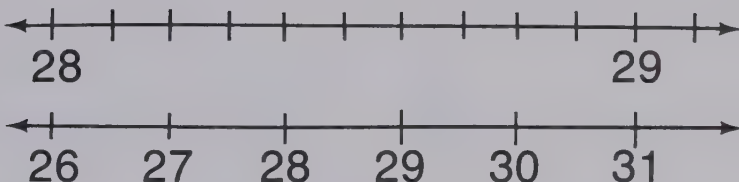




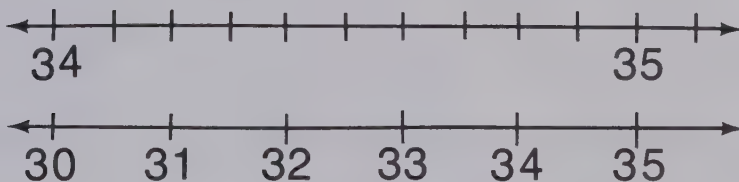
1.  $10.3 - 2.0 =$  \_\_\_\_\_



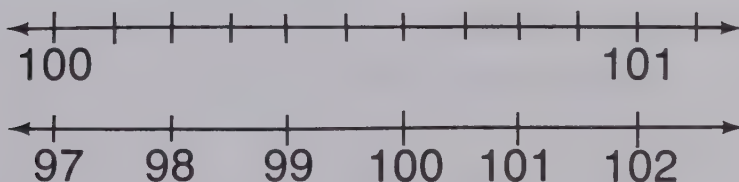
2.  $25.4 + 3.1 =$  \_\_\_\_\_



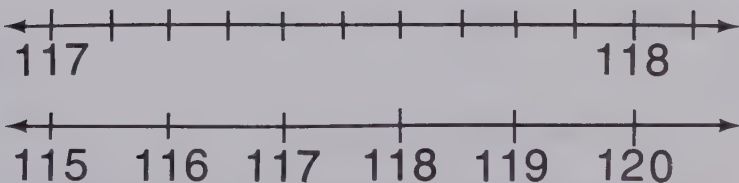
3.  $46.7 - 12.3 =$  \_\_\_\_\_



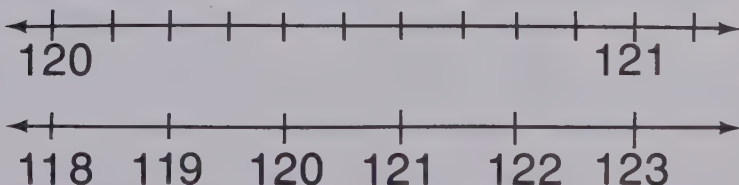
4.  $97.4 + 3.0 =$  \_\_\_\_\_

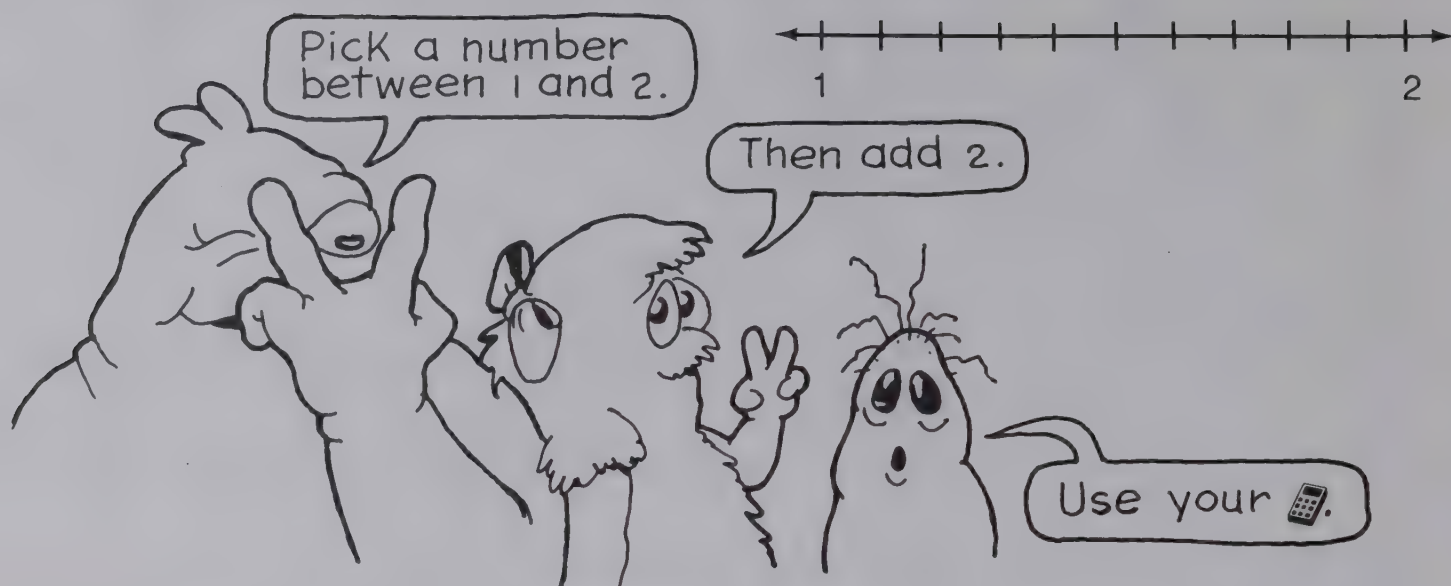


5.  $103.1 + 14.5 =$  \_\_\_\_\_



6.  $145.2 - 24.3 =$  \_\_\_\_\_





$$\underline{1.5} + 2 = \underline{3.5}$$

$$\underline{\quad\quad} + 2 = \underline{\quad\quad}$$

$$2 + \underline{\quad\quad} = \underline{\quad\quad}$$

$$\underline{\quad\quad} + 2 = \underline{\quad\quad}$$

$$2 + \underline{\quad\quad} = \underline{\quad\quad}$$

$$\underline{\quad\quad} + 2 = \underline{\quad\quad}$$

$$2 + \underline{\quad\quad} = \underline{\quad\quad}$$

$$\underline{\quad\quad} + 2 = \underline{\quad\quad}$$

$$2 + \underline{\quad\quad} = \underline{\quad\quad}$$

Is each sum less than 4?        Why?       

Find each sum.

I.  $1.9 + 1.5 = \underline{\quad\quad}$

I.  $1.8 + 1.2 = \underline{\quad\quad}$

D.  $1.4 + 1.5 = \underline{\quad\quad}$

O.  $1.3 + 1.2 = \underline{\quad\quad}$

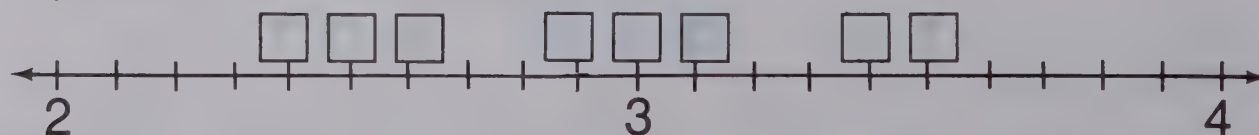
Y.  $1.1 + 1.3 = \underline{\quad\quad}$

D.  $1.5 + 1.6 = \underline{\quad\quad}$

T.  $1.7 + 1.8 = \underline{\quad\quad}$

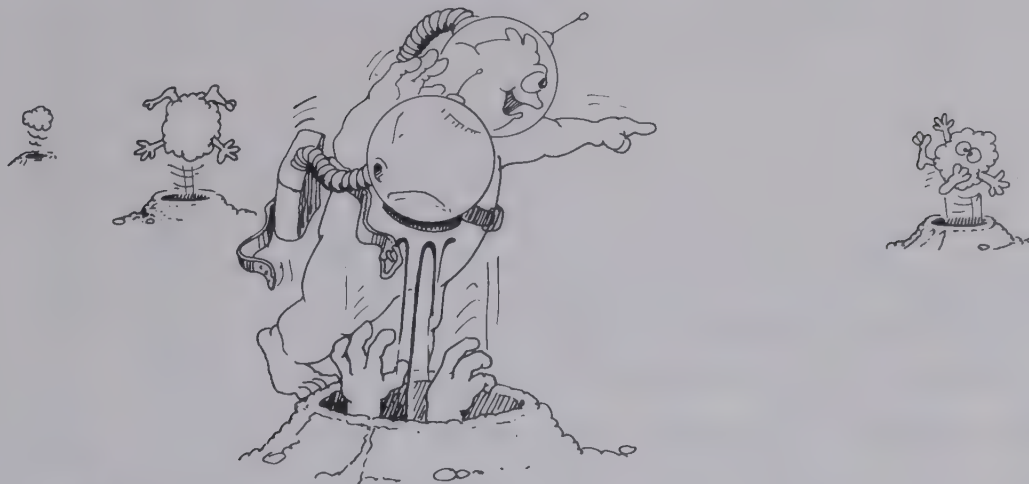
U.  $1.1 + 1.5 = \underline{\quad\quad}$


Now locate each answer on the number line. Write the letter of the problem in the box above its answer.



Why is each sum less than 4?





Use your  to solve these.

T.  $3.5 + 0 =$  \_\_\_\_\_

A.  $3.5 - 1 =$  \_\_\_\_\_

S.  $3.5 + 1 =$  \_\_\_\_\_

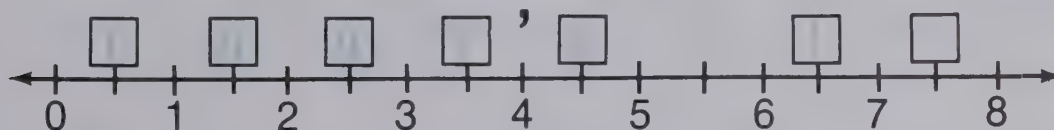
H.  $3.5 - 2 =$  \_\_\_\_\_

I.  $3.5 + 3 =$  \_\_\_\_\_

T.  $3.5 - 3 =$  \_\_\_\_\_

T.  $3.5 + 4 =$  \_\_\_\_\_

Locate each answer on the number line. Write the letter of the problem in the box above its answer.



Solve.

L.  $44.5 + 1 =$  \_\_\_\_\_

E.  $50.5 - 1 =$  \_\_\_\_\_

L.  $44.5 + 2 =$  \_\_\_\_\_

E.  $50.5 + 1 =$  \_\_\_\_\_

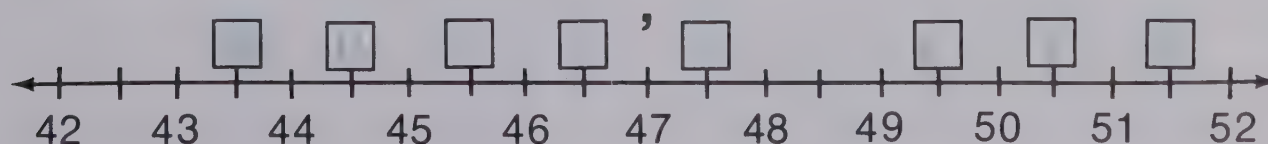
S.  $44.5 + 3 =$  \_\_\_\_\_

Y.  $40.5 + 10 =$  \_\_\_\_\_

U.  $46.5 - 2 =$  \_\_\_\_\_

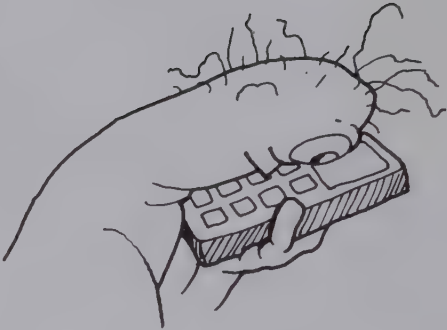
B.  $50.5 - 7 =$  \_\_\_\_\_



What is the secret message?



Use your  to complete this table.

X	0.5	2	2.5
2	1	4	5
20	10		
100			
8			
200			
17			



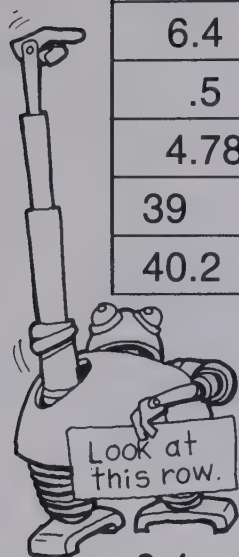
Try to fill in this table without using your  .  
Use your  to check your guesses.

	0.5	2	2.5
4	2	8	
50			
12			
5			
9			



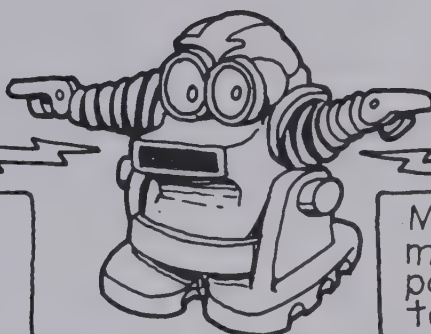
Use your  to complete this table.

X	1000	100	10	1	0.1	0.01
6	6000	600	60	6	0.6	0.06
6.4	6400	640	64	6.4	0.64	0.064
.5	500	50	5	0.5	0.05	0.005
4.78	4780	478	47.8	4.78	0.478	0.0478
39	39,000	3900	390	39	3.9	0.39
40.2	40,200	4020	402	40.2	4.02	0.402



$$6.4 \times 100 = 640.$$

Multiplying by 100 moves the decimal point two places to the right.




$$6.4 \times 0.1 = 0.64$$

Multiplying by 0.1 moves the decimal point one place to the left.

Complete this table.

Multiply by	Move Decimal Point	
	Number of Places	Direction
100	2	right
10		
0.1		
0.01		
1000		

Try to answer these without using your .

Use your  to check.

- $54.8 \times 10 =$  548
- $28.3 \times 1000 =$  28,300
- $43.6 \times 0.1 =$  4.36
- $1.7 \times 100 =$  170
- $146.5 \times 0.001 =$  0.1465



Use your  to complete both tables.

X	1000	100	10	1	0.1	0.01
8	8000				0.8	0.08
2.5			25	2.5		
306	306,000	30,600				
16.57						0.1657

÷	0.001	0.01	0.1	1	10	100
8		800		8		
2.5	2500					0.025
306			3060	306		
16.57	16,570		165.7			0.1657

Compare the tables. Do you see a pattern?  
Complete these statements.

Use patterns  
to do these.

- Multiplying by 1000 is the same as dividing by \_\_\_\_\_.
- Multiplying by 0.1 is the same as dividing by \_\_\_\_\_.
- Multiplying by 10 is the same as dividing by \_\_\_\_\_.
- Dividing by 0.01 is the same as multiplying by \_\_\_\_\_.
- Dividing by 1 is the same as multiplying by \_\_\_\_\_.
- Dividing by 100 is the same as multiplying by \_\_\_\_\_.





This is how I practice multiplication facts. I'll try .5 first.

Enter  $\square \cdot 5 \times \square =$ . The .5 is now locked in your calculator.

Enter  $\textcircled{8}$ .

Give your answer. Say, "Eight times point five equals four."

Press  $\square =$ .

If your answer is correct, mark an O.K.

Enter  $\textcircled{7}$ .

Give your answer.

Press  $\square =$ .

If your answer is correct, mark an O.K.

Incorrect answers should be marked with X.



8 OK

7 \_\_\_\_\_

2 \_\_\_\_\_

Try these.

$\square \times$   
2 \_\_\_\_\_  
4 \_\_\_\_\_  
3 \_\_\_\_\_  
0 \_\_\_\_\_  
4 \_\_\_\_\_  
2 \_\_\_\_\_  
3 \_\_\_\_\_  
5 \_\_\_\_\_  
0 \_\_\_\_\_  
1 \_\_\_\_\_

$\square \times$   
3 \_\_\_\_\_  
1 \_\_\_\_\_  
7 \_\_\_\_\_  
9 \_\_\_\_\_  
0 \_\_\_\_\_  
6 \_\_\_\_\_  
4 \_\_\_\_\_  
2 \_\_\_\_\_  
8 \_\_\_\_\_  
5 \_\_\_\_\_

$\square \times$   
70 \_\_\_\_\_  
60 \_\_\_\_\_  
80 \_\_\_\_\_  
900 \_\_\_\_\_  
30 \_\_\_\_\_  
40 \_\_\_\_\_  
70 \_\_\_\_\_  
50 \_\_\_\_\_  
400 \_\_\_\_\_  
90 \_\_\_\_\_

$\square \times$   
6 \_\_\_\_\_  
20 \_\_\_\_\_  
9 \_\_\_\_\_  
100 \_\_\_\_\_  
40 \_\_\_\_\_  
50 \_\_\_\_\_  
300 \_\_\_\_\_  
0 \_\_\_\_\_  
70 \_\_\_\_\_  
8 \_\_\_\_\_

School Fees

Name \_\_\_\_\_



The students at Glen Park Elementary School pay a fee each year for supplies. Use the information below to complete the chart.

	Number of Students	Fee Per Student	Total
Kindergarten	84	\$14.65	\$1,230.60
First Grade	93	\$15.40	\$1,432.20
Second Grade	87	\$18.60	\$1,618.20
Third Grade	102	\$19.50	\$1,989.00
Fourth Grade	96	\$20.50	\$1,968.00
Fifth Grade	99	\$25.60	\$2,534.40
Sixth Grade	105	\$28.00	\$2,940.00
Total			\$18,712.40

Use your to answer these questions.

- 1. A sixth grader pays how much more than a first grader? \$12.60
- 2. A fifth grader pays how much more than a fourth grader? \$5.10
- 3. Val is in third grade. She has a brother in second grade. Who pays more in fees? Val How much more? \$1.00
- 4. Mr. Lopez has 30 students in his fifth grade class. What was the total amount of fees collected? \$768.00
- 5. What is the average fee for students at Glen Park Elementary School? \$19.10
- 6. The Williams family has one first grader, two third graders, and one sixth grader at Glen Park School. How much money did they pay this year in fees? \$1,059.60



# The Indianapolis 500

Name \_\_\_\_\_



Here are the qualifying speeds for a recent Indianapolis 500.  
(Speeds are given in miles per hour.)

Row One	Row Two	Row Three	Row Four	Row Five	Row Six
193.74	189.91	188.29	186.67	185.86	184.16
192.99	189.75	188.14	186.40	185.72	185.81
192.50	189.61	187.81	186.28	185.41	186.20
Row Seven	Row Eight	Row Nine	Row Ten	Row Eleven	Row Twelve
185.88	184.34	183.91	186.29	185.06	187.04
185.07	184.22	188.79	185.85	184.32	185.32
184.38	184.18	186.10	185.15	183.93	

- Find the average speed for  
 Row One \_\_\_\_\_ Row Ten \_\_\_\_\_  
 Row Two \_\_\_\_\_ Row Eleven \_\_\_\_\_  
 Row Three \_\_\_\_\_ Row Twelve \_\_\_\_\_
- Find the average speed for the first two rows. \_\_\_\_\_
- Find the average speed for the first three rows. \_\_\_\_\_
- Find the average speed for all the cars. \_\_\_\_\_



In this teacher-directed activity, you will be loading a secret number in your students' calculators, and they will be using their problem solving and decimal skills to find the number.

**SAMPLE GAME**

To enter 4 as a secret number, press  $4 \div =$  . (The display will show 1.)

Pass the calculators back to the students.

Students begin to enter their guesses. Whenever a guess is correct, the display will show 1.

For example:

A student guesses 7. To check his guess, he enters  $7 =$  . The display shows 1.75, so the guess is incorrect. (After playing this game several times, the student may also reason that the guess is too high, and that his next guess should be a lower number.)

He now presses  $5 =$  and the display shows 1.25.

Next he presses  $4 =$  and the 1 in the display tells him that 4 is the secret number.

This game may be played many times, with the entire class, small groups, or with students challenging each other to find their own secret numbers. The keystroking for entering a Make One secret number is:  $\boxed{\text{secret number}} \div =$  . The keystroking for each guess is:  $\boxed{\text{guess}} =$  . (The calculator should not be cleared between guesses.) A correct guess will result in a 1 in the display.

Varying the size of the secret number makes the game more challenging.

**VARIATIONS**

A variation of Make One is Make Zero, a game involving problem solving and skills with integers. The keystroking for this game is only slightly different.

To enter 7 as the secret number, press  $7 - = =$  . (The display will show 0.)

Guesses are entered in the same way, but the correct guess will result in a 0 in the display.

When playing these games for the first time, students may find it helpful to record each guess and the resulting display.

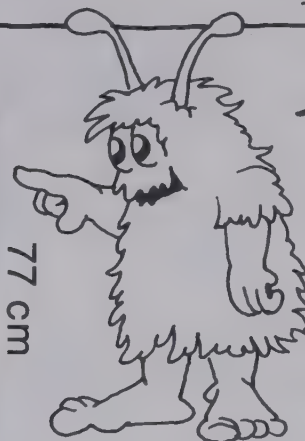
Make Zero	
Number Entered	Number Displayed
<u>4</u>	<u>-3</u>
<u>8</u>	<u>1</u>
<u>7</u>	<u>0</u>
Secret Number: <u>7</u>	




If you measure all the way around this rectangle, you'll know its perimeter.

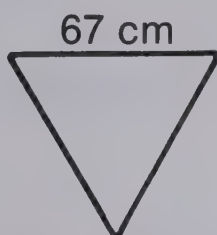


What is the perimeter of this rectangle?



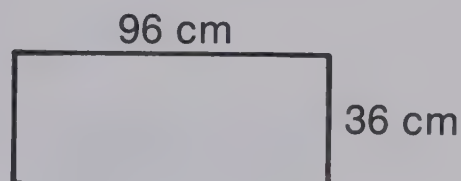
Here are some more polygons. Use your  to find each perimeter.

1.



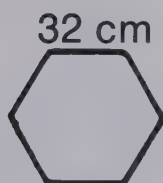
perimeter: \_\_\_\_\_

2.



perimeter: \_\_\_\_\_

3.



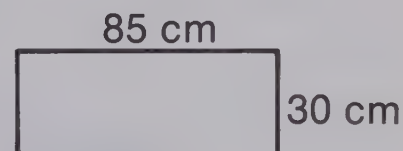
perimeter: \_\_\_\_\_

4.



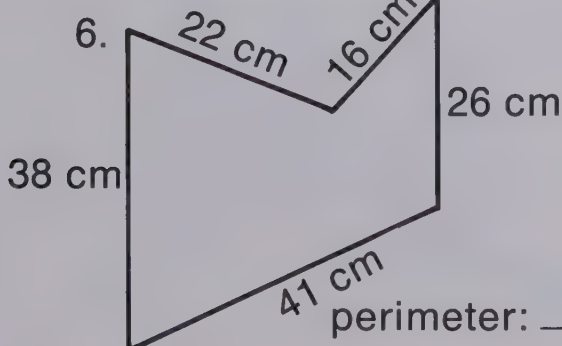
perimeter: \_\_\_\_\_

5.

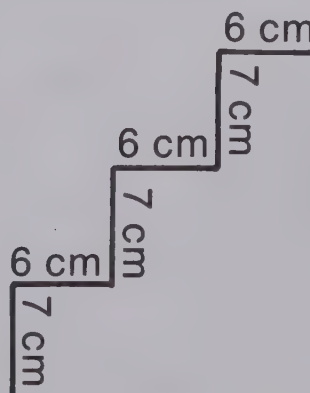


perimeter: \_\_\_\_\_

Find the perimeter of these polygons.




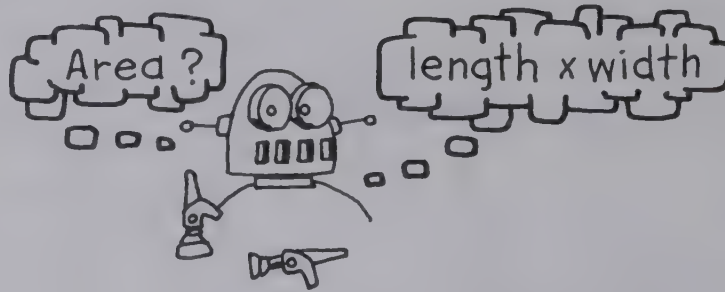
perimeter: \_\_\_\_\_



perimeter: \_\_\_\_\_

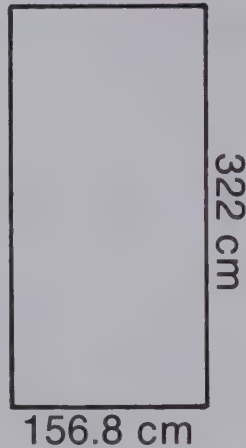
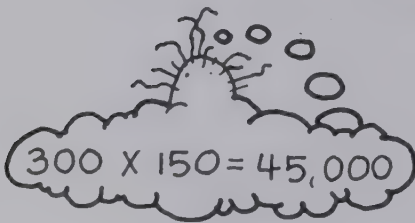


Estimate the area of each polygon. Then use your  to find the actual area.



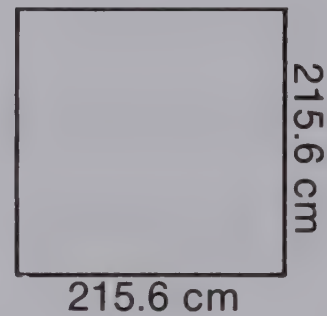
1. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_



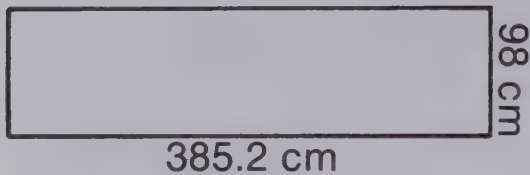
2. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_



3. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_



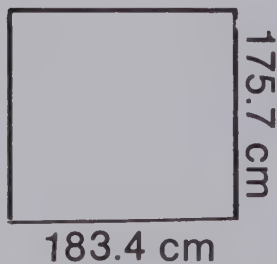
4. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_



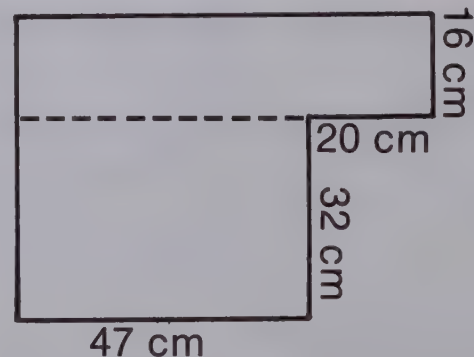
5. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_



6. Estimate: \_\_\_\_\_

Actual area: \_\_\_\_\_

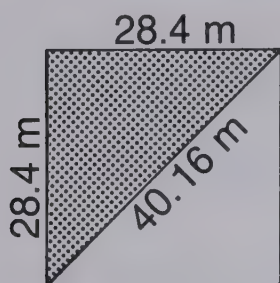




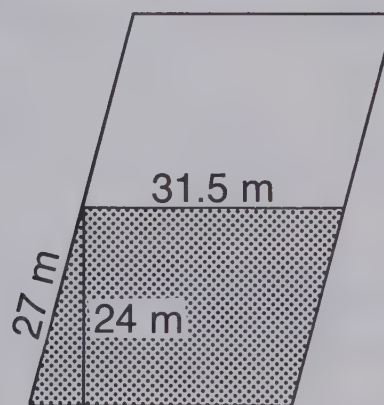


Find the area of each shaded region.

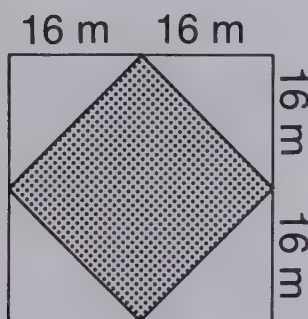
1. Area: \_\_\_\_\_



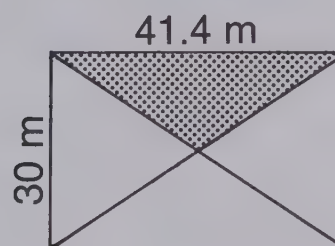
2. Area: \_\_\_\_\_



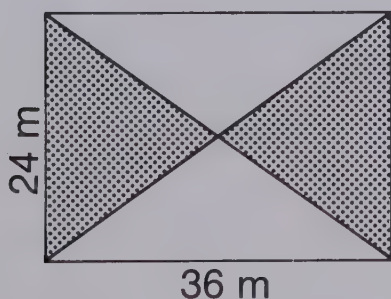
3. Area: \_\_\_\_\_



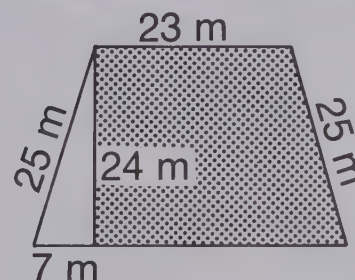
4. Area: \_\_\_\_\_



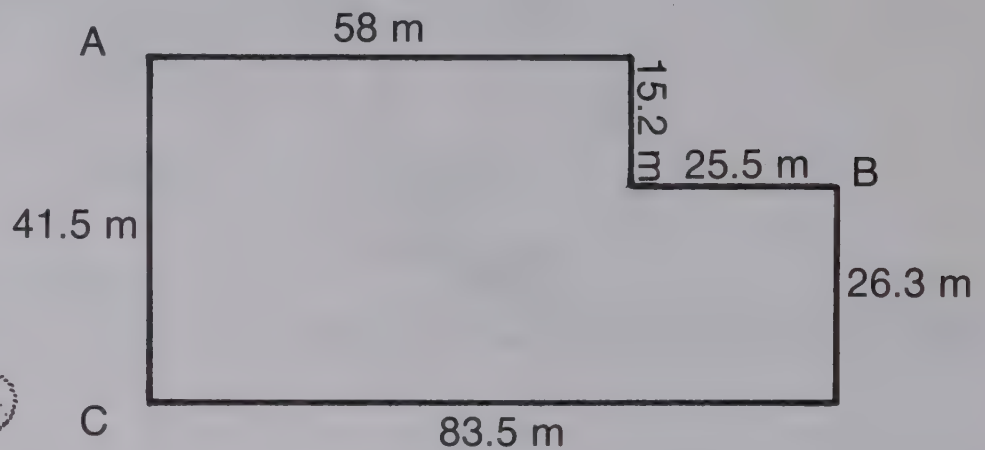
5. Area: \_\_\_\_\_



6. Area: \_\_\_\_\_



This is a map of the playground.



1. Peg ran around the playground two times. How far did she run? \_\_\_\_\_
2. Mike ran from point A to point B along the shorter path. How far did he run? \_\_\_\_\_
3. Don ran from point C to point B along the shorter path. How far did he run? \_\_\_\_\_
4. Who ran the greater distance, Mike or Don? \_\_\_\_\_
5. Jackie ran laps along the perimeter of the playground. The total distance was one kilometer. How many laps did she run? \_\_\_\_\_
6. Two teams held a relay race along the longest side of the playground. There were six runners on a team, and each runner ran one length. What was the total distance of the race? \_\_\_\_\_

What would be the total distance of the race if every runner had run one lap of the playground? \_\_\_\_\_

7. What is the area of the playground? \_\_\_\_\_

# Estimation

The following activities will enable students to develop skills in estimation. The activities include estimations involving addition, multiplication, and division of whole numbers, and addition and multiplication of decimals.



An estimate is not a wild guess, and as students use these pages, they will develop techniques for making more accurate estimates. One very useful technique, which is stressed throughout this section, is the rounding of numbers in determining close estimates.

Time is a critical element in developing estimation skills. Given time, most students will attempt to compute exact answers. Vary the amount of time so that students will be motivated to estimate quickly. Competition between groups can create excitement and distract students from focusing on exact answers.

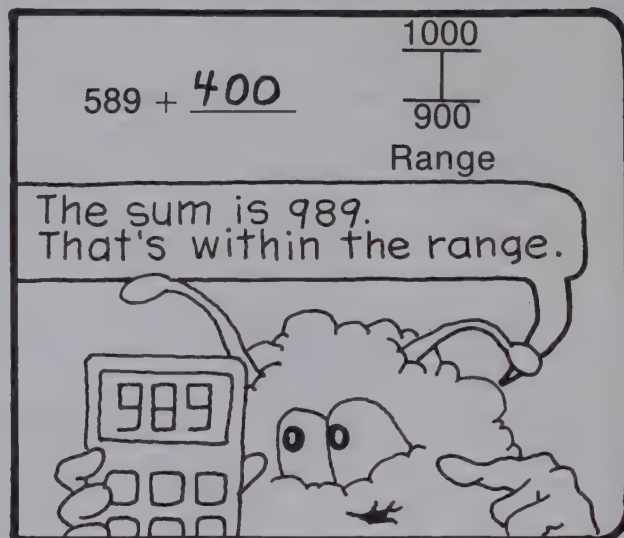
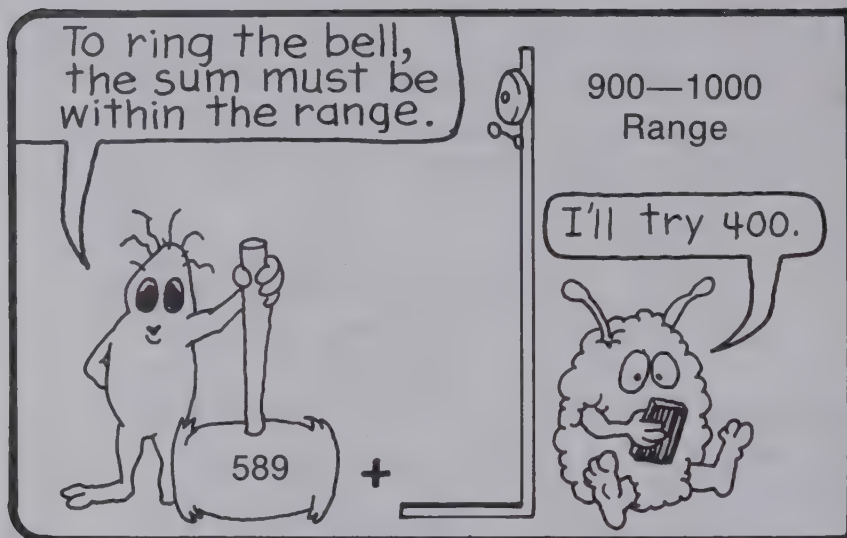
Since the calculator is a tool for accuracy, it should not be used in determining the estimates. It does provide, however, a quick and efficient way of checking estimates, and this feedback is very important to students developing these skills.

Since students will be using the calculator to determine exact answers, it is important that they realize that there are no wrong or right estimations. Responses will vary widely, and none should be judged as incorrect. Students should only be concerned with improving their estimation skills with each try.



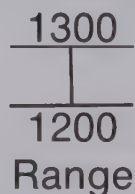
# Ringing the Bell

Name \_\_\_\_\_

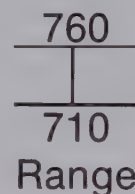


Try these. Use your to check each estimate. If the sum does not fall within the range, try another number.

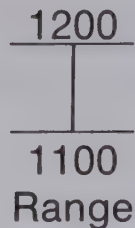
1. 871 + \_\_\_\_\_



2. 427 + \_\_\_\_\_



3. 614 + \_\_\_\_\_



4. 384 + \_\_\_\_\_



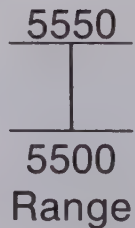
5. 298 + \_\_\_\_\_



6. 3241 + \_\_\_\_\_




7. 1821 + \_\_\_\_\_

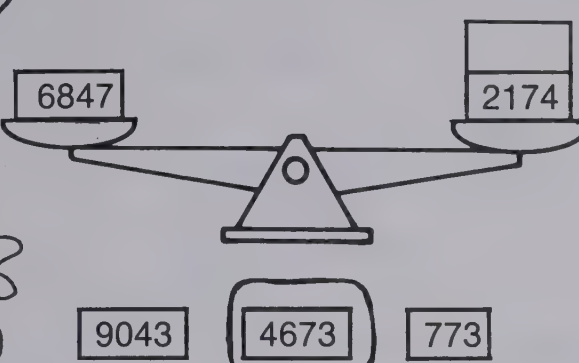


8. 5564 + \_\_\_\_\_



Which brick will balance the scale?






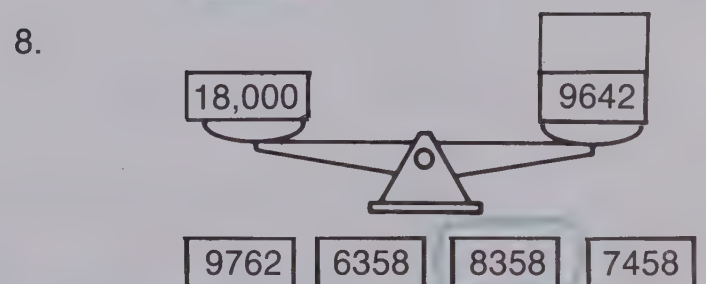
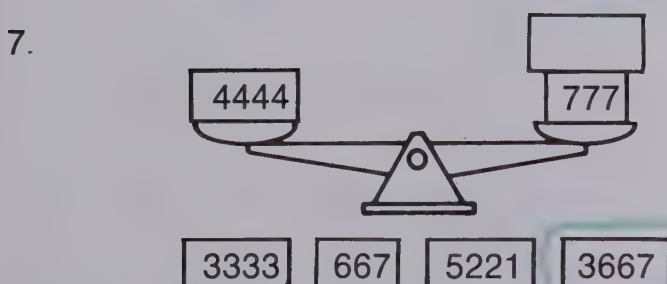
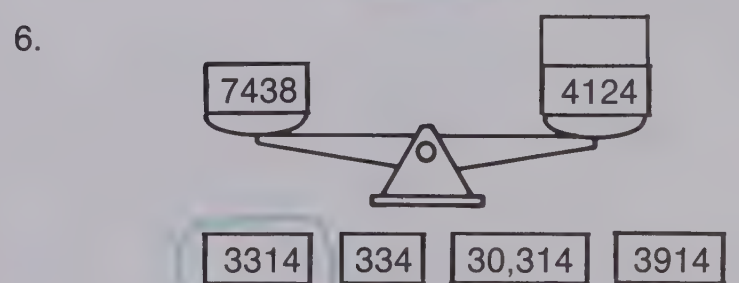
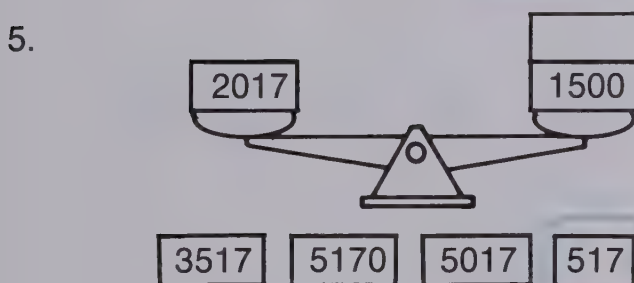
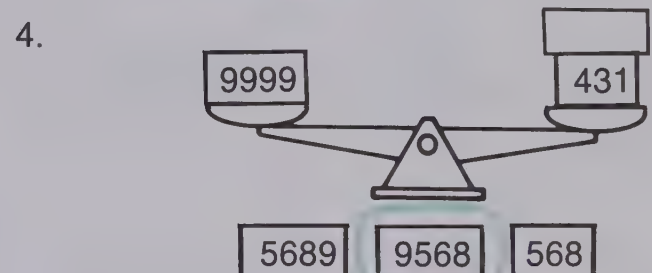
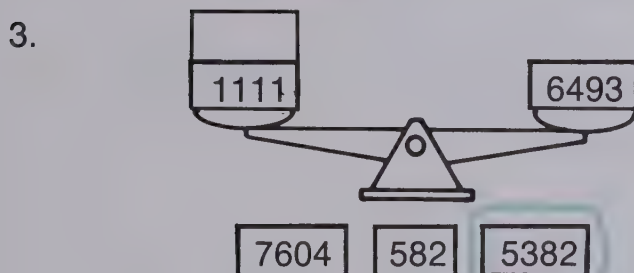
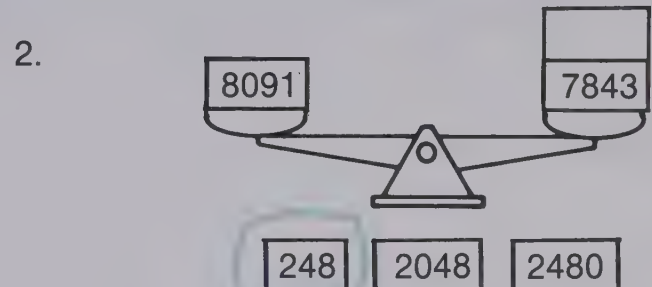
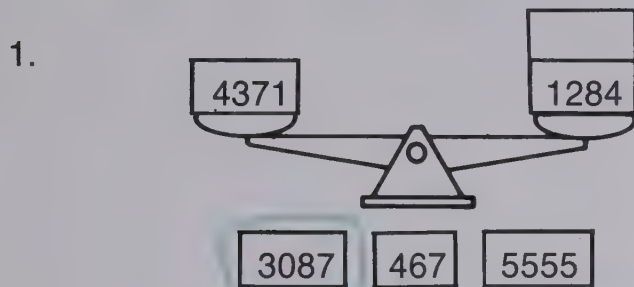
I'll try 4673.

$2174 + 4673 =$

The sum is 6847. That means the scale is balanced.




Try these. Circle your estimate.



To estimate the product:

$$\begin{array}{r} 87 \\ \times 54 \\ \hline 90 \\ 50 \\ \hline 4500 \end{array}$$

Round each factor to the nearest ten.  
Multiply the rounded numbers.

Use your  to find the actual product. Then subtract for the difference.

$$\begin{array}{r} 4698 \\ \text{Actual} \\ \text{Product} \end{array} - \begin{array}{r} 4500 \\ \text{Estimate} \end{array} = \begin{array}{r} 198 \\ \text{Difference} \end{array}$$

Try these.

1.  $\begin{array}{r} 38 \\ \times 22 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference

2.  $\begin{array}{r} 29 \\ \times 39 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference

3.  $\begin{array}{r} 43 \\ \times 18 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference

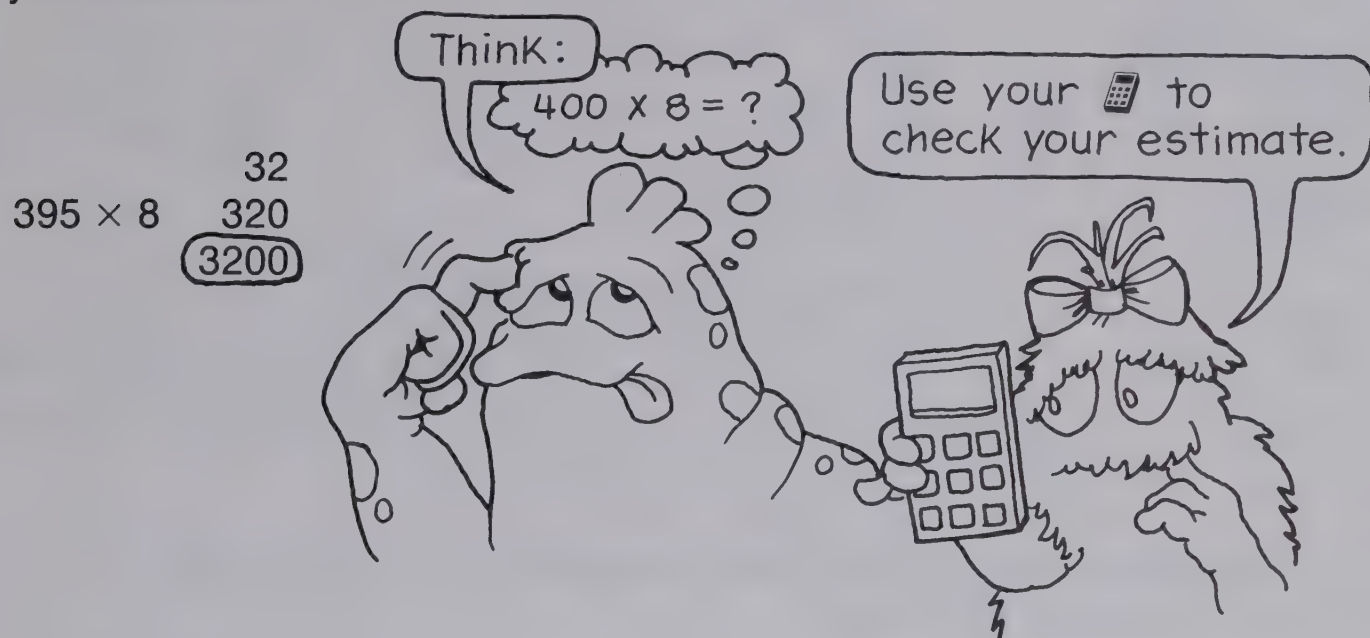
4.  $\begin{array}{r} 57 \\ \times 36 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference

5.  $\begin{array}{r} 81 \\ \times 52 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference

6.  $\begin{array}{r} 91 \\ \times 19 \\ \hline \end{array}$  \_\_\_\_\_  
 \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_  
 Actual Product      Estimate      Difference



Estimate the product. Then circle the answer that is closest to your estimate.



Try these.

1.  $56 \times 7$     42  
                  420  
                  4200

2.  $88 \times 9$     81  
                  810  
                  8100

3.  $127 \times 6$     60  
                  600  
                  6000

4.  $387 \times 8$     32  
                  320  
                  3200

5.  $289 \times 7$     21  
                  210  
                  2100

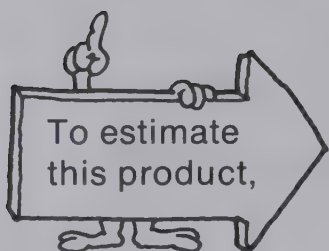
6.  $461 \times 8$     4000  
                  4500  
                  4700

7.  $893 \times 7$     6300  
                  6500  
                  6700

8.  $777 \times 9$     6300  
                  7200  
                  8000

9.  $38 \times 42$     1000  
                  1600  
                  2000

10.  $17 \times 84$     1000  
                  1600  
                  2000



$$\begin{array}{r} 483 \\ \times 26 \\ \hline \end{array}$$



$$\begin{array}{r} 500 \\ \times 30 \\ \hline \end{array}$$



Estimate each product. Circle the answer that is closest to your estimate. Use your to check.

1.  $\begin{array}{r} 185 \\ \times 32 \\ \hline \end{array}$

600  
6000  
60,000

2.  $\begin{array}{r} 341 \\ \times 29 \\ \hline \end{array}$

900  
9000  
90,000

3.  $\begin{array}{r} 411 \\ \times 39 \\ \hline \end{array}$

160  
1600  
16,000

4.  $\begin{array}{r} 257 \\ \times 23 \\ \hline \end{array}$

650  
6500  
65,000

5.  $\begin{array}{r} 121 \\ \times 35 \\ \hline \end{array}$

5000  
4000  
3000

6.  $\begin{array}{r} 567 \\ \times 43 \\ \hline \end{array}$

20,000  
24,000  
28,000

7.  $\begin{array}{r} 483 \\ \times 57 \\ \hline \end{array}$

27,000  
35,000  
43,000

8.  $\begin{array}{r} 391 \\ \times 68 \\ \hline \end{array}$

18,000  
20,000  
27,000

8.  $\begin{array}{r} 813 \\ \times 74 \\ \hline \end{array}$

40,000  
50,000  
60,000

10.  $\begin{array}{r} 991 \\ \times 52 \\ \hline \end{array}$

42,000  
52,000  
62,000

Find the missing factor. The product must be within the range.



1500—1600  
Range

Number of tries: \_\_\_\_\_

I'll try 4.

387, x, 4, =



1548 falls within the range.  
I got it on the first try.

Try these.

1. 
$$\begin{array}{r} 225 \\ \times \quad \end{array}$$

10  
8  
6  
4

1200—1700  
Range

Number of tries: \_\_\_\_\_

2. 
$$\begin{array}{r} 381 \\ \times \quad \end{array}$$

10  
8  
6  
4

1300—1700  
Range

Number of tries: \_\_\_\_\_

3. 
$$\begin{array}{r} 547 \\ \times \quad \end{array}$$

10  
8  
6  
4

4000—5000  
Range

Number of tries: \_\_\_\_\_

4. 
$$\begin{array}{r} 209 \\ \times \quad \end{array}$$

11  
9  
7  
5

2100—2400  
Range

Number of tries: \_\_\_\_\_

5. 
$$\begin{array}{r} 418 \\ \times \quad \end{array}$$

9  
8  
7  
6

2700—3100  
Range

Number of tries: \_\_\_\_\_

6. 
$$\begin{array}{r} 747 \\ \times \quad \end{array}$$

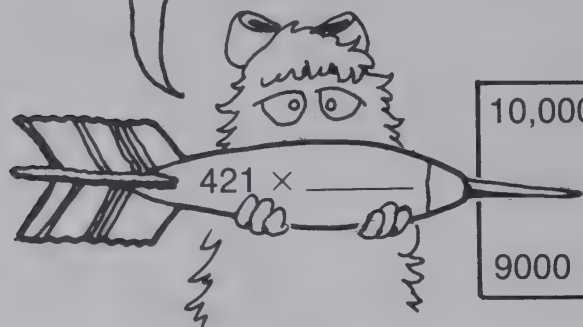
9  
8  
7  
6

4000—5000  
Range

Number of tries: \_\_\_\_\_



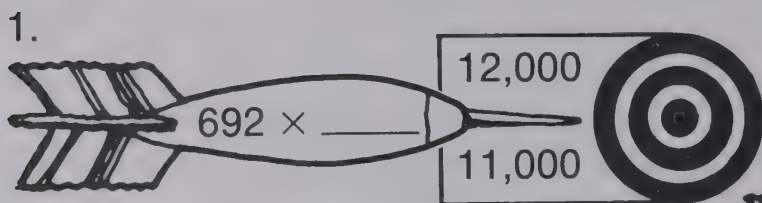
The dart will hit the target if the product is within the range.



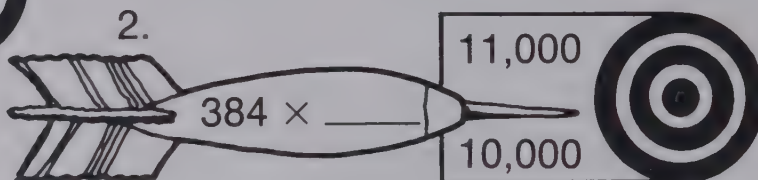
I tried 20 and missed. Now I'll try 22.



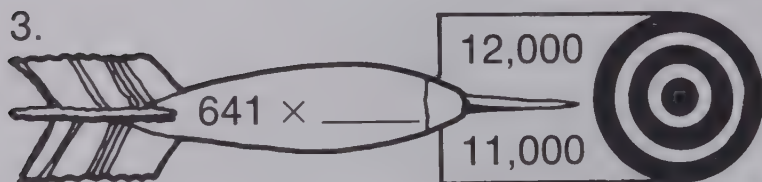
Try these. Record the number of tries.



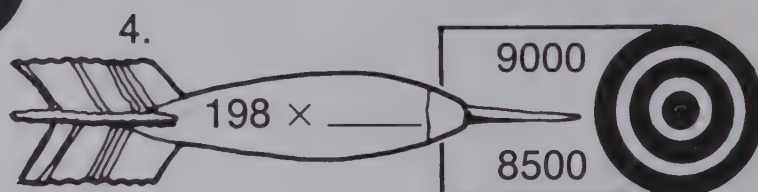
Number of tries: \_\_\_\_\_



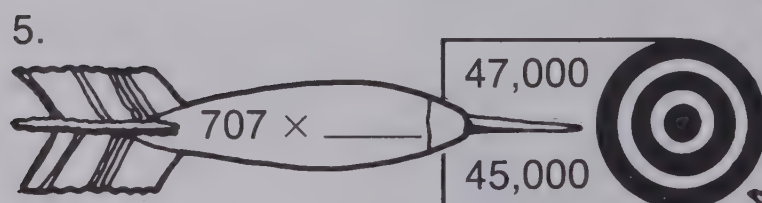
Number of tries: \_\_\_\_\_



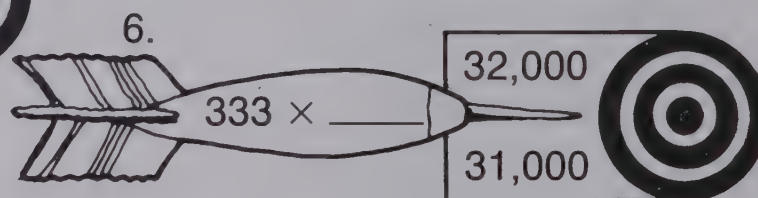
Number of tries: \_\_\_\_\_



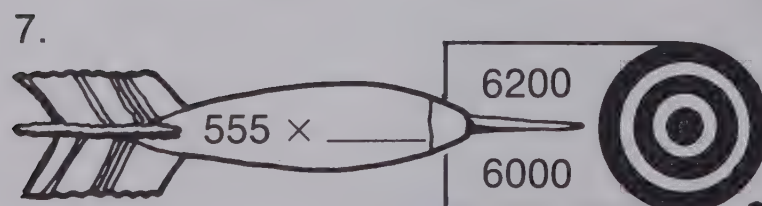
Number of tries: \_\_\_\_\_



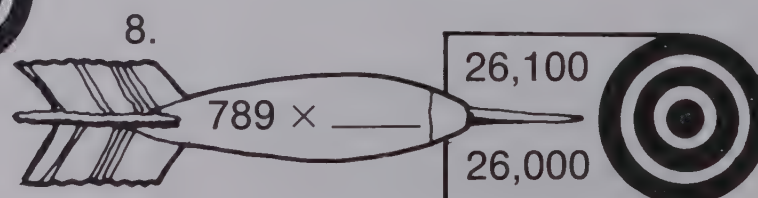
Number of tries: \_\_\_\_\_



Number of tries: \_\_\_\_\_

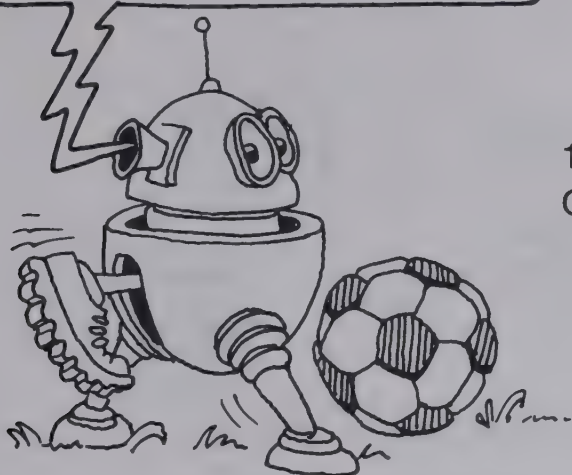


Number of tries: \_\_\_\_\_



Number of tries: \_\_\_\_\_

Estimate the missing factor. The product should be close to the goal.

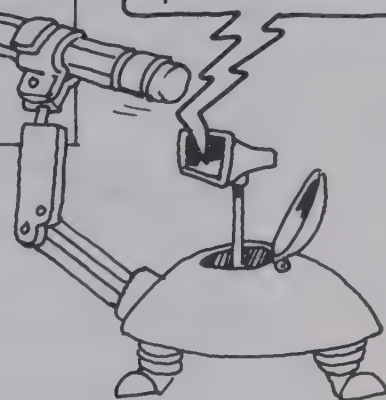


$18 \times \underline{\hspace{2cm}}$   
Goal: 1000



Numbers Tried	
<del>51</del>	<del>55</del>
56	

56 gives the closest product.



Try these.

1.  $13 \times \underline{\hspace{2cm}}$   
Goal: 800

Numbers Tried

2.  $18 \times \underline{\hspace{2cm}}$   
Goal: 700

Numbers Tried

3.  $23 \times \underline{\hspace{2cm}}$   
Goal: 900

Numbers Tried

4.  $27 \times \underline{\hspace{2cm}}$   
Goal: 800

Numbers Tried

5.  $46 \times \underline{\hspace{2cm}}$   
Goal: 520

Numbers Tried

6.  $57 \times \underline{\hspace{2cm}}$   
Goal: 710

Numbers Tried

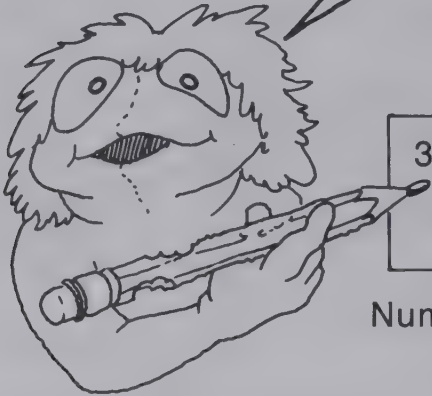
7.  $63 \times \underline{\hspace{2cm}}$   
Goal: 650

Numbers Tried

8.  $78 \times \underline{\hspace{2cm}}$   
Goal: 1000

Numbers Tried

Circle two numbers whose product falls within the range.

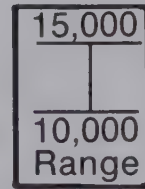


316	8
75	42

Number of tries: \_\_\_\_\_

316 x 75 is too great.

316 x 42 falls within the range.  
It took me two tries.



Try these. Circle your choices. Record the number of tries.

1.

132	7
28	81

1000
900
Range

Number of tries: \_\_\_\_\_

2.

72	9
41	263

13,000
10,000
Range

Number of tries: \_\_\_\_\_

3.

89	13
63	641

6000
5000
Range

Number of tries: \_\_\_\_\_

4.

389	62
124	27

1900
1500
Range

Number of tries: \_\_\_\_\_

5.

31	9
584	27

6000
5000
Range

Number of tries: \_\_\_\_\_

6.

879	54
207	91

15,000
10,000
Range

Number of tries: \_\_\_\_\_

7.

99	55
77	33

3000
2500
Range

Number of tries: \_\_\_\_\_

8.

51	342
34	432

23,000
22,000
Range

Number of tries: \_\_\_\_\_

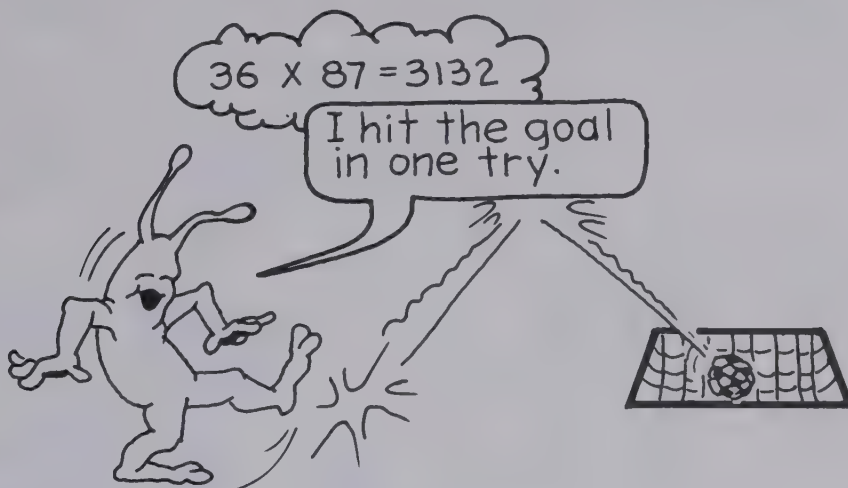


Circle two numbers whose product equals the goal. Use estimation in making your choice. Use your  to check your answer.

32	59
<u>36</u>	<u>87</u>

$\frac{3132}{\text{Goal}}$

Number of tries: \_\_\_\_\_



Try these.

1. 

31	21
93	53

 $\frac{1643}{\text{Goal}}$

Number of tries: \_\_\_\_\_

2. 

17	52
12	82

 $\frac{204}{\text{Goal}}$

Number of tries: \_\_\_\_\_

3. 

57	27
62	32

 $\frac{1824}{\text{Goal}}$

Number of tries: \_\_\_\_\_

4. 

112	42
52	22

 $\frac{1144}{\text{Goal}}$

Number of tries: \_\_\_\_\_

5. 

71	51
31	101

 $\frac{2201}{\text{Goal}}$

Number of tries: \_\_\_\_\_

6. 

55	15
85	205

 $\frac{3075}{\text{Goal}}$

Number of tries: \_\_\_\_\_

7. 

99	139
59	19

 $\frac{5841}{\text{Goal}}$


Number of tries: \_\_\_\_\_

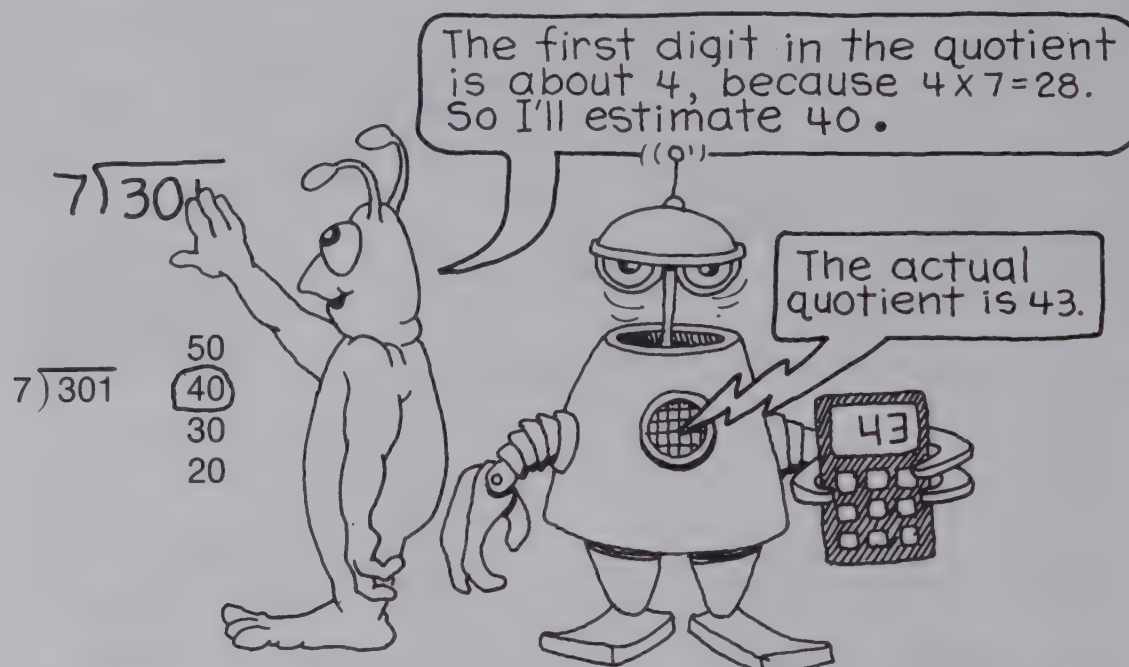
8. 

32	102
62	202

 $\frac{6464}{\text{Goal}}$

Number of tries: \_\_\_\_\_

Estimate the quotient. Circle the number that is closest to your estimate. Use your  to find the actual quotient.



1.  $6 \overline{)258}$

50  
40  
30  
20

2.  $3 \overline{)221}$

70  
60  
50  
40

3.  $8 \overline{)342}$

70  
60  
50  
40

4.  $7 \overline{)486}$

80  
70  
60  
50

5.  $4 \overline{)332}$

80  
70  
60  
50

6.  $7 \overline{)409}$

80  
70  
60  
50

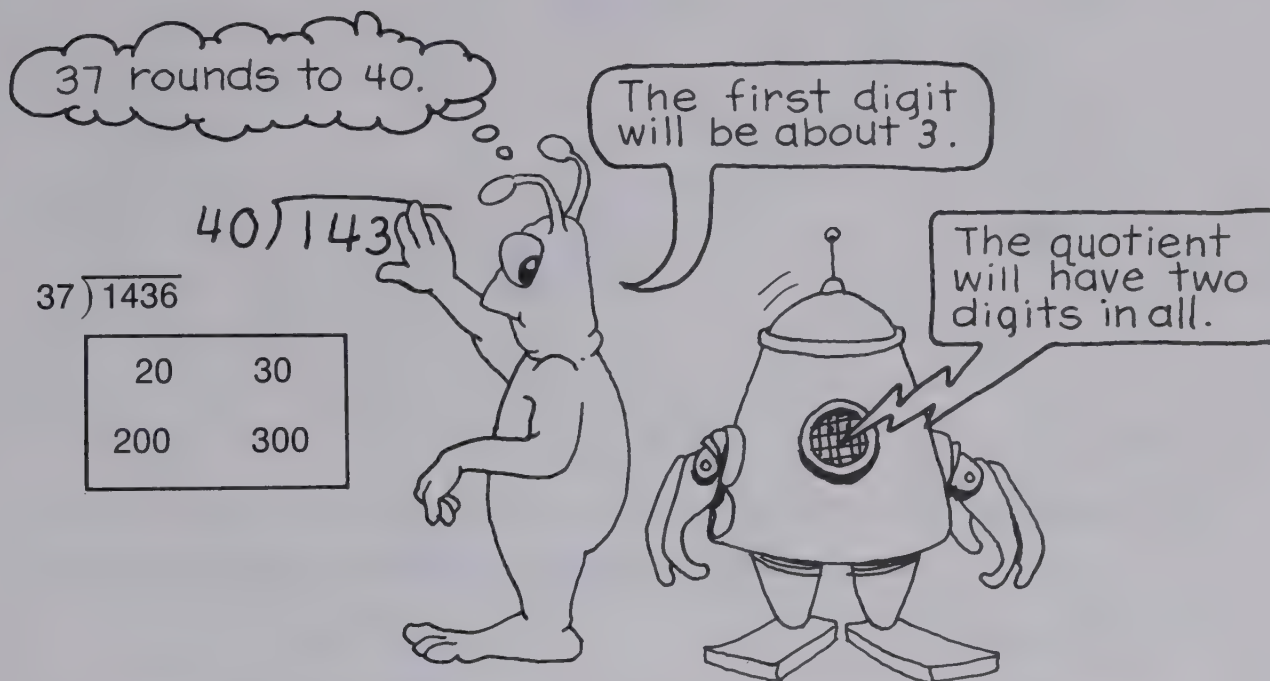
7.  $6 \overline{)574}$

90  
80  
70  
60

8.  $6 \overline{)238}$

60  
50  
40  
30

To estimate each quotient, round the divisor to the nearest ten.



Try these. Circle the answer that is closest to your estimate.  
Use your to check.

- |                          |   |    |    |     |     |                            |   |    |    |     |     |
|--------------------------|---|----|----|-----|-----|----------------------------|---|----|----|-----|-----|
| 1. 52 $\overline{)1612}$ | <table border="1"> <tr> <td>20</td> <td>30</td> </tr> <tr> <td>200</td> <td>300</td> </tr> </table> | 20 | 30 | 200 | 300 | 2. 18 $\overline{)5832}$   | <table border="1"> <tr> <td>20</td> <td>30</td> </tr> <tr> <td>200</td> <td>300</td> </tr> </table> | 20 | 30 | 200 | 300 |
| 20                       | 30  |    |    |     |     |                            |   |    |    |     |     |
| 200                      | 300   |    |    |     |     |                            |   |    |    |     |     |
| 20                       | 30  |    |    |     |     |                            |   |    |    |     |     |
| 200                      | 300   |    |    |     |     |                            |   |    |    |     |     |
| 3. 49 $\overline{)2548}$ | <table border="1"> <tr> <td>50</td> <td>60</td> </tr> <tr> <td>500</td> <td>600</td> </tr> </table> | 50 | 60 | 500 | 600 | 4. 22 $\overline{)13,442}$ | <table border="1"> <tr> <td>50</td> <td>60</td> </tr> <tr> <td>500</td> <td>600</td> </tr> </table> | 50 | 60 | 500 | 600 |
| 50                       | 60  |    |    |     |     |                            |   |    |    |     |     |
| 500                      | 600   |    |    |     |     |                            |   |    |    |     |     |
| 50                       | 60  |    |    |     |     |                            |   |    |    |     |     |
| 500                      | 600   |    |    |     |     |                            |   |    |    |     |     |
| 5. 13 $\overline{)1612}$ | <table border="1"> <tr> <td>10</td> <td>20</td> </tr> <tr> <td>100</td> <td>200</td> </tr> </table> | 10 | 20 | 100 | 200 | 6. 67 $\overline{)34,974}$ | <table border="1"> <tr> <td>40</td> <td>50</td> </tr> <tr> <td>400</td> <td>500</td> </tr> </table> | 40 | 50 | 400 | 500 |
| 10                       | 20  |    |    |     |     |                            |   |    |    |     |     |
| 100                      | 200   |    |    |     |     |                            |   |    |    |     |     |
| 40                       | 50  |    |    |     |     |                            |   |    |    |     |     |
| 400                      | 500   |    |    |     |     |                            |   |    |    |     |     |
| 7. 34 $\overline{)3298}$ | <table border="1"> <tr> <td>10</td> <td>20</td> </tr> <tr> <td>100</td> <td>200</td> </tr> </table> | 10 | 20 | 100 | 200 | 8. 78 $\overline{)3220}$   | <table border="1"> <tr> <td>30</td> <td>40</td> </tr> <tr> <td>300</td> <td>400</td> </tr> </table> | 30 | 40 | 300 | 400 |
| 10                       | 20  |    |    |     |     |                            |   |    |    |     |     |
| 100                      | 200   |    |    |     |     |                            |   |    |    |     |     |
| 30                       | 40  |    |    |     |     |                            |   |    |    |     |     |
| 300                      | 400   |    |    |     |     |                            |   |    |    |     |     |



Estimate the quotient.

$$31 \overline{)64356}$$



The quotient will have four digits.

$$31 \overline{)642}$$



The first digit is about 2.



Let's estimate 2000.

Try these. Use your  to find the actual quotient.

1.  $43 \overline{)9245}$

Estimate: \_\_\_\_\_

Actual: 215

2.  $51 \overline{)6834}$

Estimate: \_\_\_\_\_

Actual: 134

3.  $22 \overline{)9086}$

Estimate: \_\_\_\_\_

Actual: 413

4.  $33 \overline{)20262}$

Estimate: \_\_\_\_\_

Actual: 614

5.  $64 \overline{)128832}$

Estimate: \_\_\_\_\_

Actual: 2013

6.  $29 \overline{)9599}$

Estimate: \_\_\_\_\_

Actual: 331

7.  $47 \overline{)5358}$

Estimate: \_\_\_\_\_

Actual: 114

8.  $34 \overline{)78540}$

Estimate: \_\_\_\_\_

Actual: 2310

9.  $56 \overline{)187096}$

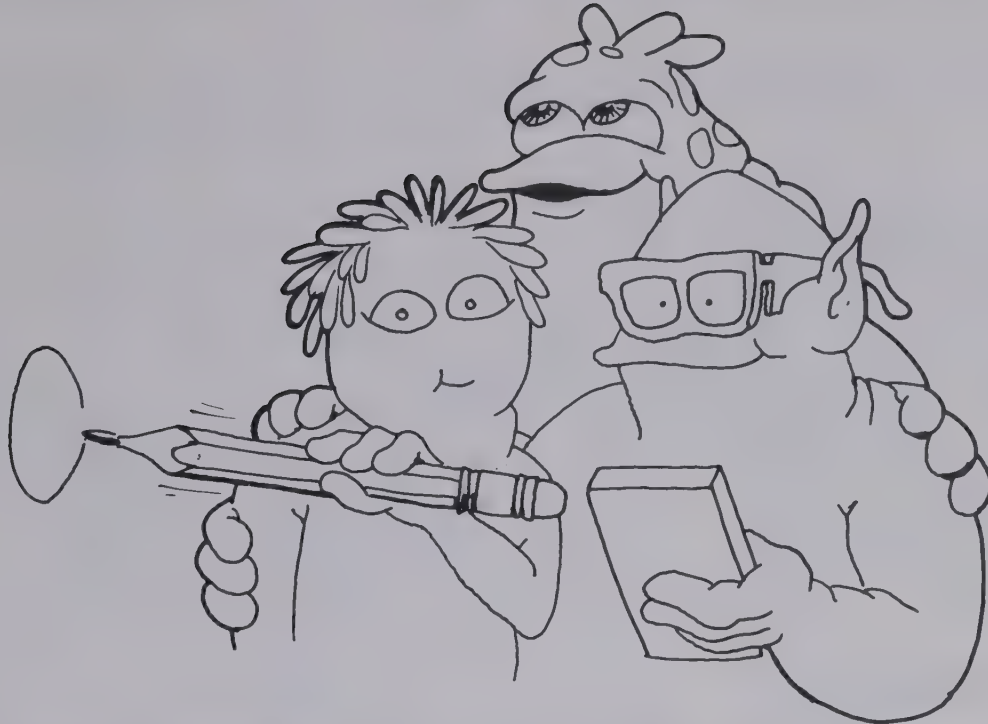
Estimate: \_\_\_\_\_


Actual: 334

10.  $78 \overline{)61074}$

Estimate: \_\_\_\_\_

Actual: 783



Estimate each answer. Circle the number that is closest to your estimate. Use your  to check.

- |  |   |   |   |
|--|---|---|---|
| 1. $\begin{array}{r} 89 \\ \times 16 \\ \hline \end{array}$        | $\begin{array}{r} 2054 \\ 1924 \\ 1424 \\ 1254 \end{array}$         | 2. $\begin{array}{r} 857 \\ 421 \\ + 642 \\ \hline \end{array}$ | $\begin{array}{r} 1920 \\ 1720 \\ 1520 \\ 1320 \end{array}$ |
| 3. $\begin{array}{r} 15,728 \\ - 6,411 \\ \hline \end{array}$      | $\begin{array}{r} 14,017 \\ 13,427 \\ 9,317 \\ 8,017 \end{array}$   | 4. $\begin{array}{r} 47 \\ \times 47 \\ \hline \end{array}$     | $\begin{array}{r} 2509 \\ 2209 \\ 1609 \\ 1209 \end{array}$ |
| 5. $\begin{array}{r} 70,402 \\ - 8,773 \\ \hline \end{array}$      | $\begin{array}{r} 78,429 \\ 70,429 \\ 69,429 \\ 61,629 \end{array}$ | 6. $\begin{array}{r} 897 \\ \times 6 \\ \hline \end{array}$     | $\begin{array}{r} 6082 \\ 5382 \\ 4382 \\ 3782 \end{array}$ |
| 7. $\begin{array}{r} 3184 \\ 5992 \\ + 6677 \\ \hline \end{array}$ | $\begin{array}{r} 15,853 \\ 14,153 \\ 13,253 \\ 12,853 \end{array}$ | 8. $\begin{array}{r} 666 \\ \times 6 \\ \hline \end{array}$     | $\begin{array}{r} 4296 \\ 3996 \\ 3696 \\ 2996 \end{array}$ |
| 9. $\begin{array}{r} 60,051 \\ - 38,977 \\ \hline \end{array}$     | $\begin{array}{r} 98,074 \\ 38,074 \\ 31,074 \\ 21,074 \end{array}$ | 10. $\begin{array}{r} 334 \\ \times 25 \\ \hline \end{array}$   | $\begin{array}{r} 9680 \\ 8350 \\ 8010 \\ 7680 \end{array}$ |


To estimate the sum:



Round each addend to the nearest one.  
Add the rounded numbers.  
Circle the answer that is closest to  
your estimate.

$$\begin{array}{r} 18.6 + 7.25 \\ \underline{19} \quad \underline{7} \end{array}$$

$$\begin{array}{r} 911 \\ 96 \\ \hline 26 \end{array}$$

Pssst...  
Use your   
to find the  
actual sum.



Try these.

1.  $4.7 + 0.9$

$$\underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 56 \\ 6 \\ \hline 0.56 \end{array}$$

2.  $3.2 + 1.7$

$$\underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 49 \\ 5 \\ \hline 0.49 \end{array}$$

3.  $11.8 + 0.16$

$$\underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 134 \\ 12 \\ 2 \end{array}$$

4.  $5.96 + 2.4$

$$\underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 836 \\ 84 \\ 8 \end{array}$$

5.  $0.9 + 0.65$

$$\underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 15.5 \\ 2 \\ 0.5 \end{array}$$

6.  $3.7 + 2.8 + 1.4$

$$\underline{\quad} \quad \underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 8 \\ 6 \\ 4 \end{array}$$

7.  $0.82 + 5.19 + 6.3$

$$\underline{\quad} \quad \underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 20 \\ 12 \\ 6 \end{array}$$

8.  $4.78 + 0.6 + 1.14$

$$\underline{\quad} \quad \underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 11 \\ 9 \\ 7 \end{array}$$

9.  $5.33 + 53.3 + 0.53$

$$\underline{\quad} \quad \underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 60 \\ 50 \\ 40 \end{array}$$

10.  $4.1 + 0.89 + 5.06$

$$\underline{\quad} \quad \underline{\quad} \quad \underline{\quad}$$

$$\begin{array}{r} 30 \\ 20 \\ 10 \end{array}$$



Circle two numbers whose sum is closest to the goal number.

Use your  to check your estimation.

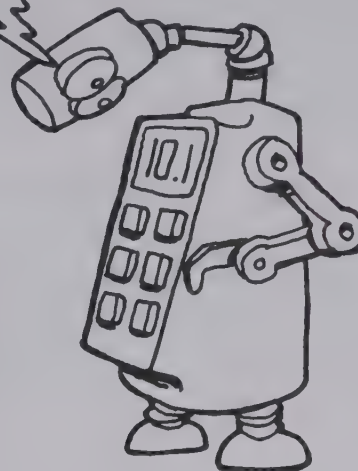
8.9	1.2
3.4	8.2
5.1	4.1

10  
Goal

I'll choose  
8.9 and 1.2.



The actual sum is 10.1.



Try these.

1.

9.6	4.8
2.7	3.3
6.1	0.6

10  
Goal

Actual sum: \_\_\_\_\_

2.

12.2	6.6
5.4	9.6
19.2	1.2

20  
Goal

Actual sum: \_\_\_\_\_

3.

3.4	8.8
0.7	2.6
4.7	5.8

10  
Goal

Actual sum: \_\_\_\_\_

4.

18.3	14.4
1.8	28.7
9.9	8.1

30  
Goal

Actual sum: \_\_\_\_\_

5.

0.83	6.9
8.3	0.69
83	14.9

15  
Goal

Actual sum: \_\_\_\_\_

6.

12.5	14.8
1.25	1.48
10.4	18.5

25  
Goal

Actual sum: \_\_\_\_\_

7.

8.7	0.78
5.2	7.8
6.8	9.2

15  
Goal

Actual sum: \_\_\_\_\_

8.

0.75	8.4
29.9	24.2
12.6	4.9


35  
Goal


Actual sum: \_\_\_\_\_

Number of Players: 2

Materials:   ; 2 different-colored sets of markers, 8 markers per set

Object of Game: To have 4 markers in a row in any direction

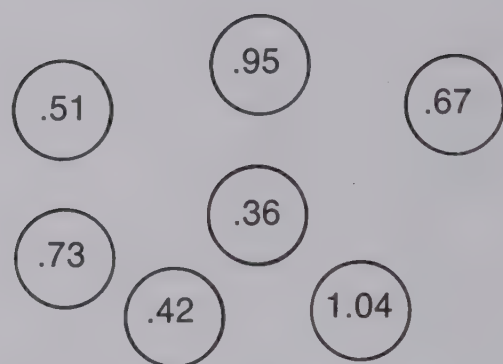
Rules: To see who starts, use your  to find the sum of all seven digits in your telephone number. If your sum is closer to 30 than your opponent's, you start the game.

Take turns choosing two circled numbers. Use your  to find their sum. If the sum is on the board, place a marker on it. If the sum is not on the board, or if the sum has a marker on it, wait for your next turn.

The first player to have four markers in a row in any direction is the winner.

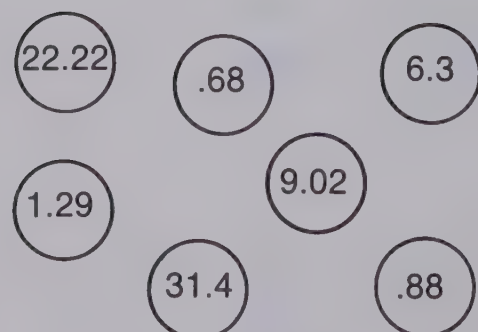
If all sums have markers on them and no player has four markers in a row, the game is a tie.

## Game 1



1.18	.78	1.68	1.31
1.77	1.03	1.40	1.37
1.24	1.09	1.46	1.62
.87	1.15	1.71	.93

## Game 2

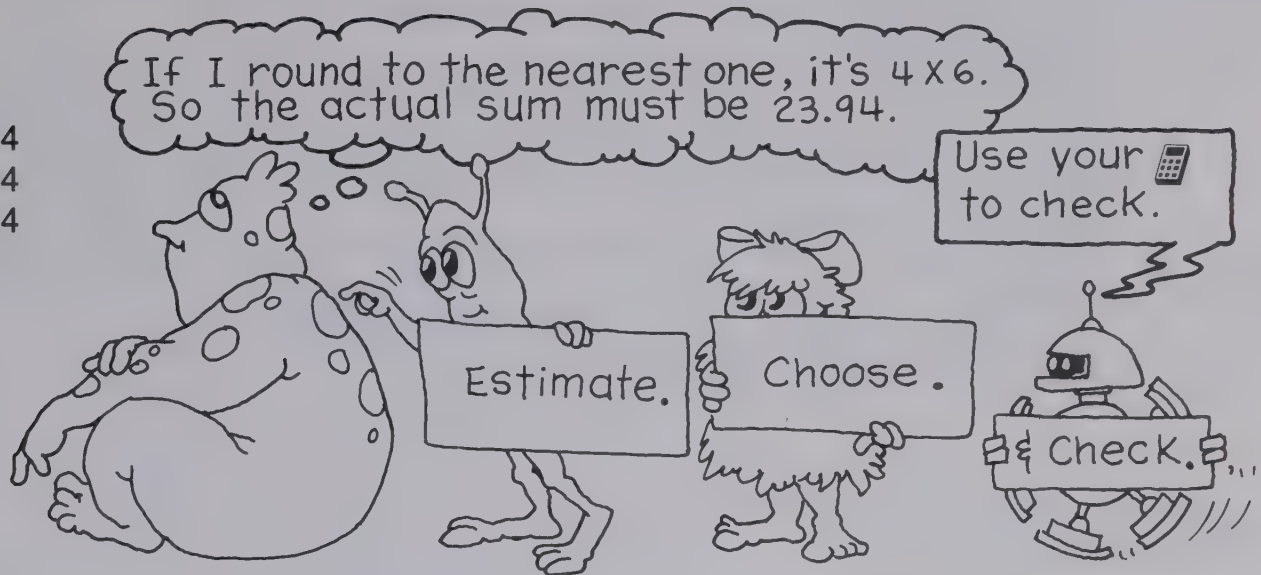


7.18	28.52	53.62	9.70
15.32	1.97	23.51	37.70
32.08	2.17	9.90	1.56
6.98	10.31	32.69	23.10

Estimate the product. Then use your estimate to choose the actual product.

$$\begin{array}{r} 5.7 \\ \times 4.2 \\ \hline \end{array}$$



$$\begin{array}{r} 239.4 \\ 23.94 \\ 2.394 \\ 0.24 \end{array}$$




- |    |   |  |    |   |   |
|----|---|--|----|---|---|
| 1. | $\begin{array}{r} 1.8 \\ \times 3.6 \\ \hline \end{array}$  | $\begin{array}{r} 648 \\ 64.8 \\ 6.48 \\ 0.68 \end{array}$     | 2. | $\begin{array}{r} 4.3 \\ \times 2.9 \\ \hline \end{array}$  | $\begin{array}{r} 124.7 \\ 12.47 \\ 1.27 \\ 0.17 \end{array}$ |
| 3. | $\begin{array}{r} 7.5 \\ \times 3.6 \\ \hline \end{array}$  | $\begin{array}{r} 270 \\ 27 \\ 2.7 \\ 0.27 \end{array}$        | 4. | $\begin{array}{r} 2.3 \\ \times 3.8 \\ \hline \end{array}$  | $\begin{array}{r} 874 \\ 87.4 \\ 8.74 \\ 0.84 \end{array}$    |
| 5. | $\begin{array}{r} 2.35 \\ \times 1.7 \\ \hline \end{array}$ | $\begin{array}{r} 399.5 \\ 39.95 \\ 3.995 \\ 0.35 \end{array}$ | 6. | $\begin{array}{r} 1.08 \\ \times 0.5 \\ \hline \end{array}$ | $\begin{array}{r} 54 \\ 5.4 \\ 0.54 \\ 0.04 \end{array}$      |
| 7. | $\begin{array}{r} 0.6 \\ \times 0.7 \\ \hline \end{array}$  | $\begin{array}{r} 42 \\ 4.2 \\ .42 \\ 0.042 \end{array}$       | 8. | $\begin{array}{r} 4.15 \\ \times 0.8 \\ \hline \end{array}$ | $\begin{array}{r} 33.2 \\ 3.32 \\ 0.32 \\ 0.032 \end{array}$  |




Number of Players: 2

Materials:   ; 2 different-colored sets of markers, 8 markers per set

Object of Game: To have 4 markers in a row in any direction

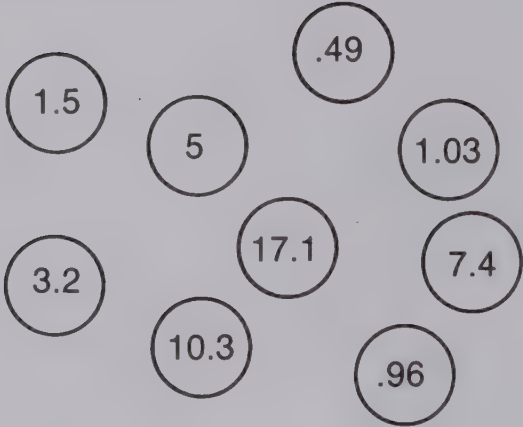
Rules: To see who starts, use your  to find the sum of all seven digits in your telephone number. If your sum is greater than your opponent's, you start the game.

Take turns choosing two circled numbers. Use your  to find their product. If the product is on the board, place a marker on it. If the product is not on the board, or if the product has a marker on it, wait for your next turn.

The first player to have four markers in a row in any direction is the winner.

If all products have markers on them and no player has four markers in a row, the game is a tie.

Game 1



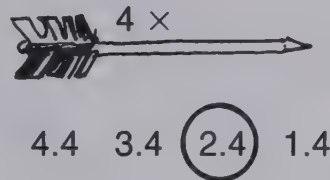
1.44	54.72	11.1	76.22
.5047	37	7.5	2.45
32.96	51.5	8.379	.9888
4.8	23.68	17.613	10.609

Game 2



2.72	7.84	20.32	4.318
9.898	101.6	16.16	115.57
.4	.544	.08	14.56
39.2	44.59	.455	.101

The product must fall within the range.

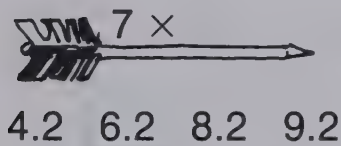


I'll try 2.4 for the other factor.

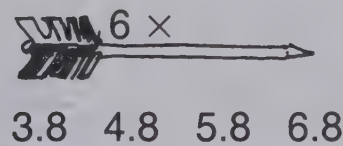


Which factor do you choose? Circle your estimate. Then use your to check.

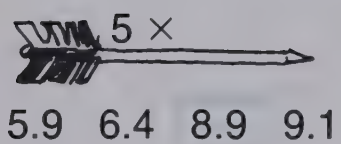
1.



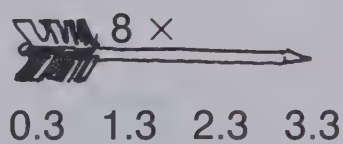
2.



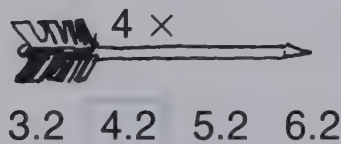
3.



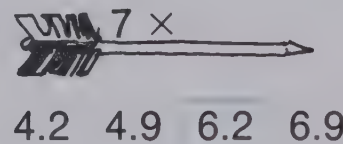
4.



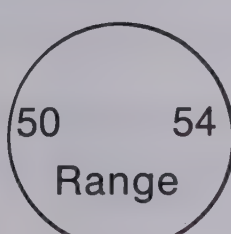
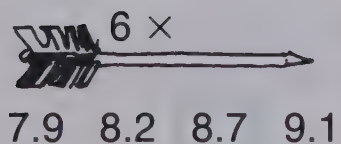
5.



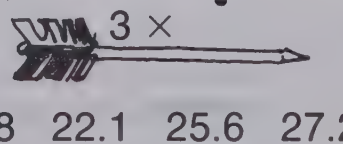
6.



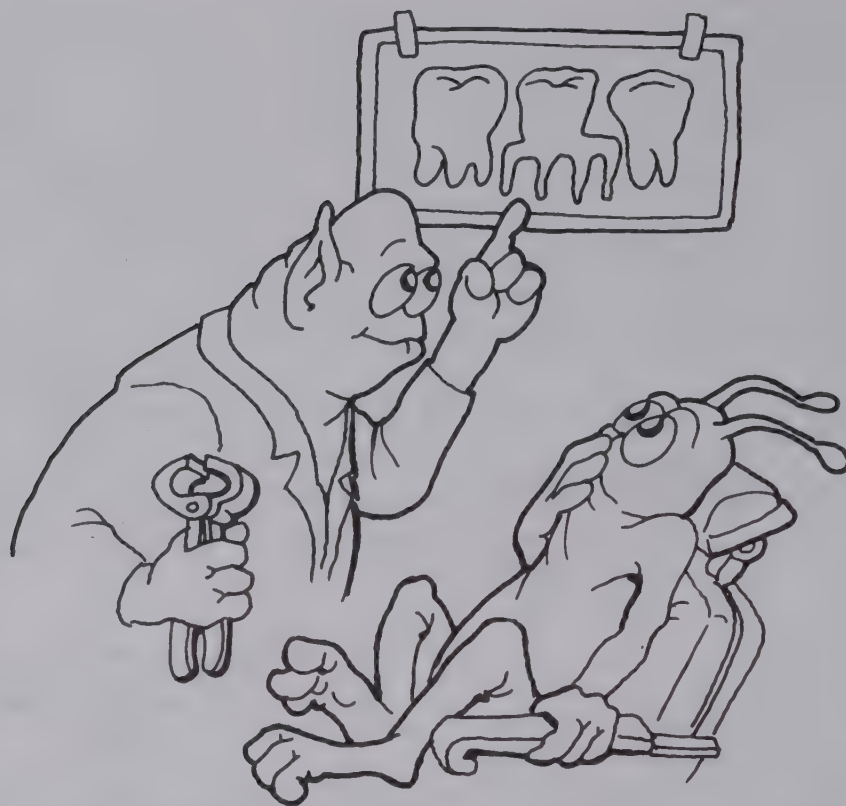
7.



8.



## Squares and Square Roots



Finding squares and square roots of numbers provides exciting problem solving. Patterns abound in the search for numbers that either begin or end with certain digits. For example, if  $\_\_\_ \times \_\_\_ = \_\_\_ 5$ , students soon notice that the number in the placeholder must have a 5 in the ones' place. Calculators allow students to explore such patterns without getting bogged down in heavy computation. The use of the calculator is particularly appropriate in developing the mathematics of squares and square roots because computing square numbers often involves multidigit numbers and finding square roots involves estimation, as well as trial and error. The calculator eliminates the tedious calculations that would usually accompany both of these activities. Thus, students have more time to focus on the mathematics and the problem solving skills that are involved.

The activities in this section generally involve finding exact square roots. Although specific algorithms exist for determining the square root of a number, any formal algorithm should be preceded by less formal experiences that help students understand what it means to find the square root of a number. The looking-for-patterns and the guess-multiply-guess strategies that are presented here will prepare students for the more complex square root problems. It will also provide readiness for the more technical square root algorithm typically found in basal textbooks.

If your calculators have square root keys, ask students not to use them. Students need to learn about the mathematics of squares and square roots before relying on a calculator key for these functions.



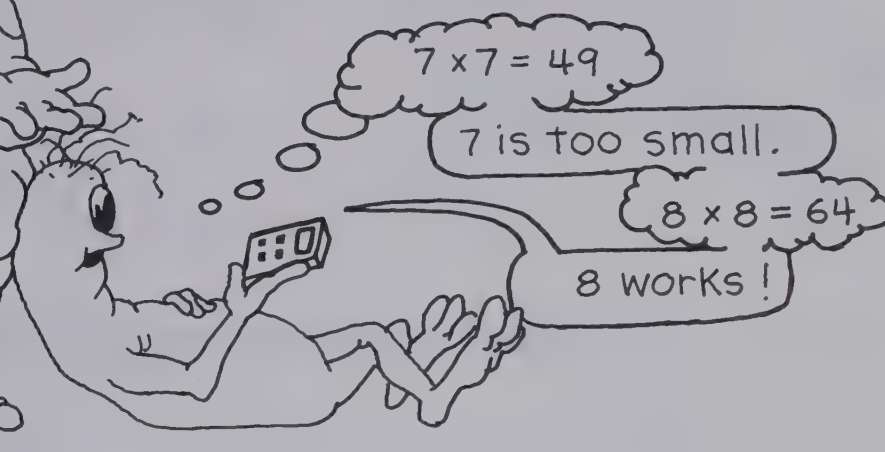


# Looking for Roots

Name \_\_\_\_\_

What number can go in both boxes?

$$\boxed{8} \times \boxed{8} = 64$$



Try these.

Remember, the same number goes in each box.

1.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 25$

2.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 81$

3.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 196$

4.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 144$

5.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 100$

6.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 169$

7.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 400$

8.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 225$

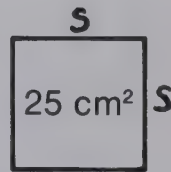
9.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 441$

10.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 625$

11.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 1600$

12.  $\boxed{\phantom{00}} \times \boxed{\phantom{00}} = 2025$

The area of this square is  $25 \text{ cm}^2$ . What is the length of one side?



$$s \times s = 25 \text{ cm}^2$$

$$5 \times 5 = 25$$

Each side is 5 cm.

Try these. Use your .

1.

$144 \text{ cm}^2$

side: \_\_\_\_ cm

2.

$225 \text{ cm}^2$

side: \_\_\_\_ cm

3.

$400 \text{ cm}^2$

side: \_\_\_\_ cm

4.

$2601 \text{ cm}^2$

side: \_\_\_\_ cm

5.

$1849 \text{ cm}^2$

side: \_\_\_\_ cm

6.

$5184 \text{ cm}^2$

side: \_\_\_\_ cm

7.

$4356 \text{ cm}^2$

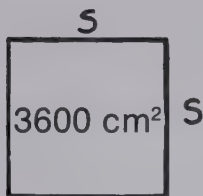
side: \_\_\_\_ cm

8.

$9801 \text{ cm}^2$

side: \_\_\_\_ cm

The area of this square is  $360 \text{ cm}^2$ . What is the length of each side?



$$s \times s = 3600$$

The sides must be 60 cm.

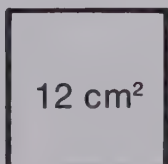


- |  |  |
|--|--|
| 1. area: $6084 \text{ cm}^2$<br>side: <u>78</u> cm     | 2. area: $12,100 \text{ cm}^2$<br>side: <u>110</u> cm  |
| 3. area: $99,225 \text{ cm}^2$<br>side: <u>315</u> cm  | 4. area: $499,849 \text{ cm}^2$<br>side: <u>707</u> cm |
| 5. area: $.2025 \text{ cm}^2$<br>side: _____ cm        | 6. area: $.04 \text{ cm}^2$<br>side: _____ cm          |
| 7. area: $1.1449 \text{ cm}^2$<br>side: <u>1.07</u> cm | 8. area: $388.09 \text{ cm}^2$<br>side: <u>19.7</u> cm |



Find the length of one side.

3.464



How close can you come?

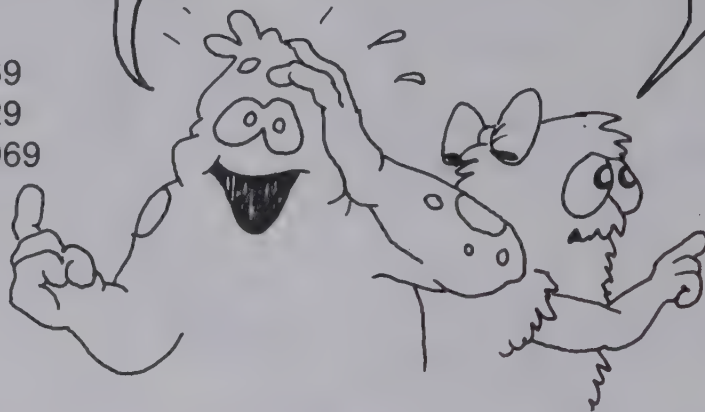


I see some patterns!

$$\begin{aligned} 3 \times 3 &= 9 \\ 13 \times 13 &= 169 \\ 23 \times 23 &= 529 \\ 63 \times 63 &= 3969 \end{aligned}$$


So do I.

$$\begin{aligned} 6 \times 6 &= 36 \\ 16 \times 16 &= 256 \\ 26 \times 26 &= 676 \\ 56 \times 56 &= 3136 \end{aligned}$$



Can you fill in these?

$$123 \times 123 = 15,12 \underline{9} \quad 106 \times 106 = 11,23 \underline{6}$$

See if the pattern works for these. Fill in the missing digit. Then use your  to check.

1.  $85 \times 85 = 722 \underline{5}$

2.  $72 \times 72 = 518 \underline{4}$

3.  $27 \times 27 = 72 \underline{9}$

4.  $43 \times 43 = 184 \underline{9}$

5.  $131 \times 131 = 17,16 \underline{1}$

6.  $825 \times 825 = 680,62 \underline{5}$

7.  $1048 \times 1048 = 1,098,30 \underline{4}$

8.  $43.5 \times 43.5 = 1892.2 \underline{5}$

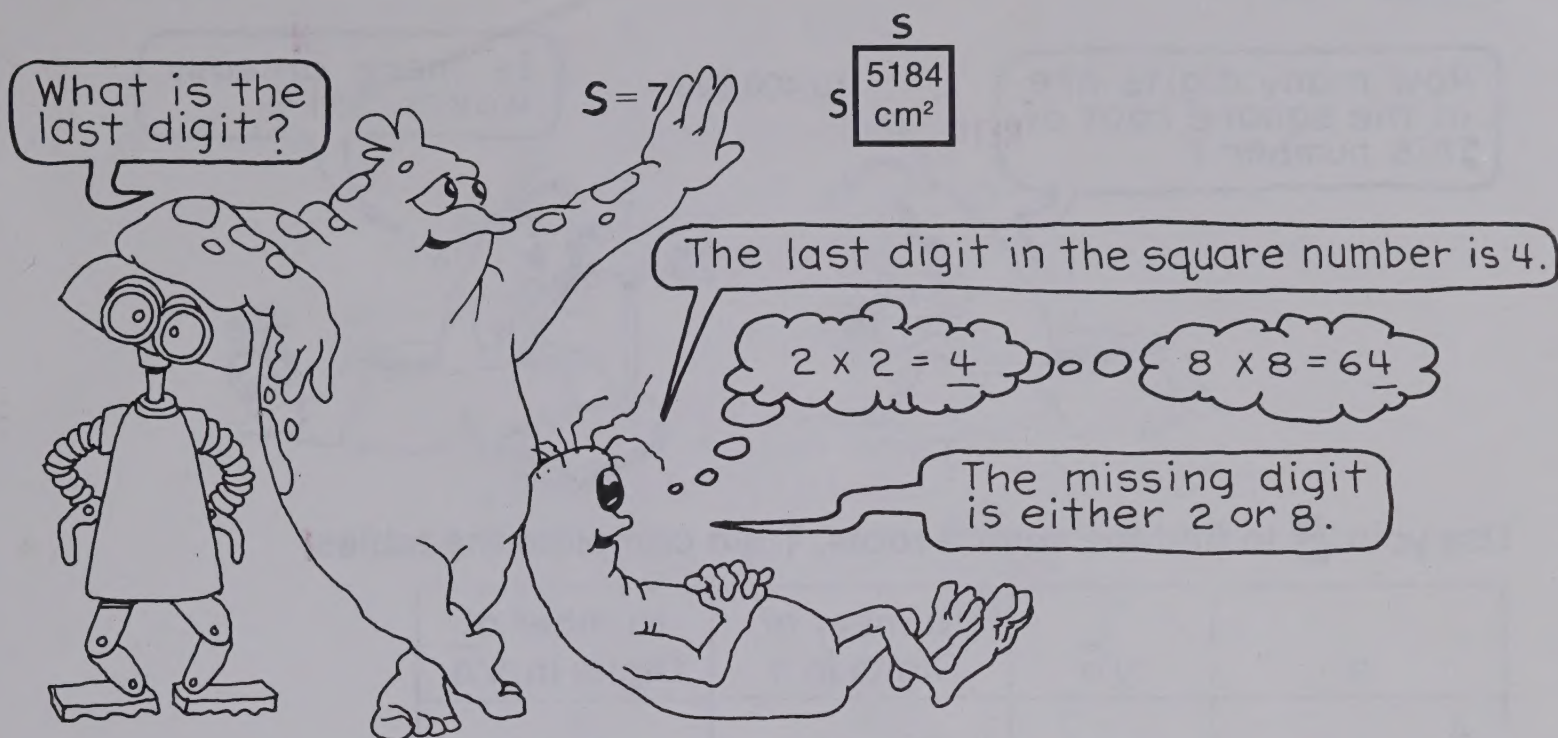
Now try these.

9.  $1.04 \times 1.04 = 1.081 \underline{6}$

10.  $7.9 \times 7.9 = 62.4 \underline{1}$

11.  $9.76 \times 9.76 = 95.257 \underline{6}$

12.  $80.4 \times 80.4 = 6464.1 \underline{6}$



Find the missing digit in each square root. Circle all of the possible digits. Then use your to find the correct digit.

- |                                |     |     |     |     |   |
|--------------------------------|-----|-----|-----|-----|---|
| 1. $\sqrt{3249} = 5\_7$        | (3) | 4   | (7) | 9   |   |
| 2. $\sqrt{3721} = 6\_1$        | (1) | 3   | 7   | (9) |   |
| 3. $\sqrt{36,100} = 19\_0$     | (0) | 2   | 5   | 8   |   |
| 4. $\sqrt{7744} = 8\_8$        | (2) | 4   | 6   | (8) |   |
| 5. $\sqrt{273,529} = 52\_3$    | 1   | (3) | 5   | (7) | 9 |
| 6. $\sqrt{9409} = 9\_7$        | 1   | (3) | 5   | (7) | 9 |
| 7. $\sqrt{1,006,009} = 100\_3$ | 1   | (3) | 5   | (7) | 9 |
| 8. $\sqrt{417,316} = 64\_6$    | 2   | (4) | (6) | 8   |   |
| 9. $\sqrt{3481} = 5\_9$        | (1) | 3   | 7   | (9) |   |
| 10. $\sqrt{4225} = 6\_5$       | 1   | 3   | (5) | 7   |   |



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How many digits are in the square root of this number?

10,400,625

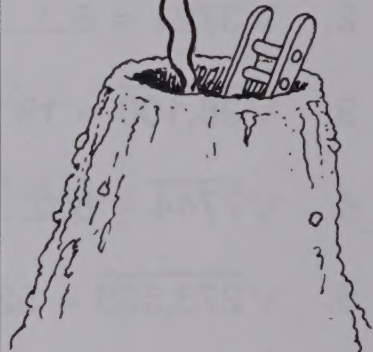
Is there an easy way to tell?



Use your to find the square roots. Then complete the tables!

$n$	$\sqrt{n}$	Number of Digits in $n$	Number of Digits in $\sqrt{n}$
4	2	1	1
16	4	2	1
64	8	2	1
81	9	2	1
100	10	3	2
169	13	3	2
2025	45	4	2
8100	90	4	2
10,000	100	5	3
30,625	175	5	3
271,441	521	6	3
490,000	700	6	3
4,481,689	2117	7	4
3,508,129	1873	7	4
25,806,400	5080	8	4
81,000,000	9000	8	4

Do you see a way of estimating the number of digits in a square root?



How many digits do these numbers have?

	Number of Digits
$\sqrt{64}$	1
$\sqrt{625}$	2
$\sqrt{15,376}$	3
$\sqrt{261,121}$	3
$\sqrt{4,884,100}$	4
$\sqrt{2116}$	2

These patterns only apply when the square root is a whole number.



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